Service Contract IP/C/JURI/ST/2006-02

The consequences for the safety of consumers and third parties of the proposed directive amending Directive 98/71/EC on legal protection of design rights

September 2006

autoPOLIS

WE BEGIN WITH AN UNDERSTANDING

54 PLAINWOOD CLOSE, CHICHESTER, WEST SUSSEX PO19 15YB, ENGLAND
TELEPHONE: +44.1243.78.00.36
FAX: + 44.1243.77.44.41
MOBILE: +44.7710.064.890
E-MAIL: jwormald@autopolis.com
Website: http://www.autopolis.com

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Executive Summary

The issue of the safety, quality and structural integrity of spare parts has been repeatedly raised by the car industry (i.e. the vehicle manufacturers), which has argued that the use of non-original body repair parts in a liberalised aftermarket can be "unsafe". The Legal Affairs Committee of the European Parliament therefore commissioned this study to help determine whether existing legislation and regulation in Europe adequately protects the safety of road users.

All products sold in Europe are covered by Directives on general product liability and general product safety. Motor vehicles and the parts used to build and repair them have long been subject to an elaborate and effective system of homologation through Type Approval. This will be reinforced by a lighter and more flexible Authorisation procedure. These approaches are more than adequate to ensure the safety of vehicles. They should in fact not be applied in a blanket fashion but selectively, in order not unnecessarily to inhibit free competition in the body repair parts aftermarket.

There is no statistical or notable anecdotal evidence of safety-related problems with non-original body repair parts, as concerns the protection of the occupants of vehicles in the event of a crash. With the possible exception of engine bonnets, the great majority of parts subject to Design Rights protection used in crash repair are non-structural or cosmetic parts, which play a negligible role in occupant protection. Conversely, they play a direct role in ensuring the safety of pedestrians and other other road users with whom vehicles may collide.

There is therefore no justifiable need to subject these parts (with the possible exception of bonnets and their latching mechanisms) to whole vehicle homologation, and the attendant whole vehicle crash tests, to which they have not historically been subjected with respect to occupant safety. Those cosmetic parts involved in pedestrian impacts should be subject to impact tests, which do not require the sacrifice of a vehicle. Structural body repair parts should be subject to homologation requirements, as defects in them can have grave implications for the future crash safety of a vehicle repaired after a major crash requiring their use.

Voluntary certification procedures are conducted by a number of institutions to ensure that non-original cosmetic body repair parts consistently achieve the level of fit, finish and quality required by body repairers and their customers, including motor insurers. Parts which have received these certifications should be allowed free access to the body repair aftermarket, provided they are also subject to pedestrian impact tests by recognised testing institutions. Body repair parts, both original and non-original, should be marked or labelled so as to ensure their traceability.

Body repair is the largest element of claims costs for motor insurers, who pay for most of the damage from crashes. Replacement body parts contribute to over 40% of the costs of body repair. Vehicle manufacturers and their franchised dealers have historically had a near-monopoly in the distribution of these parts, which enables price and margin levels which contribute disproprotionately to the overall profitability of most vehicle manufacturers. These margins are therefore not a *de minimis* issue where the interests of consumers is concerned. Invoking a general risk to safety from the use of non-original parts to protect these margins is unjustifiable. The much greater risk comes from poor body repairs caused by the capabilities of repairers falling behind the deployment of new materials and fastening technologies by vehicle manufacturers. The majority of body repairers are independent SMEs, not tied to franchised dealerships. The whole body repair community and its institutions needs to be brought into closer contact with the vehicle safety engineering community, with more attention paid to the repairability of vehicles after crashes and to the sharing of repair information.

We would not seek to extend these conclusions and recommendations to sectors other than light vehicles in the automotive industry (the scope of this study), as no others, to our knowledge, involve the large-scale consumption of replacement parts that are also contribute to the distinctive appearance of the whole complex product.

1. Origins and objectives of the study

The provisions of the proposed directive 98/71/EC on the legal protection of designs in the automotive industry continue to provoke controversy. The issue of the safety, quality and structural integrity of spare parts has been repeatedly raised by the car industry (i.e. the vehicle manufacturers), which argues that spare parts in a liberalised aftermarket can be "unsafe". The safety issue was also raised by some experts (but also strongly denied by others) during a hearing of the Legal Affairs Committee on 21.04.2005.

During its meeting on 20.6.2005, the Legal Affairs Committee therefore decided to ask for a study to be carried out on the consequences of the proposed directive for the safety of consumers and other users of complex products (including motor vehicles – the Directive applies to all industries and is not sector-specific), which have been repaired using spare parts. The study must answer two questions:

- Does existing European legislation relating to safety requirements (product safety, consumer safety, road safety) cover spare parts (defined as 'components used for the purpose of repairing a complex product') in the same way and to the same degree as the original complex product ?
- If not, what measures (legislative or other) should be taken in order to guarantee the same level of safety protection in respect of spare parts used for repairing a complex product as for the original complex product ?

Since the design legislation which gave rise to this study is confined to body-integrated visible spare parts, questions regarding their safety must likewise focus on and be answered with regard to these parts only. This involves three categories of parts in the automotive sector:

- Category No. 1: body panels, such as front and rear bumpers, front and rear wings, grilles, bonnets, door panels, trunk lids etc.
- Category No. 2: front and rear lamps, as well as integrated mirrors.
- Category No. 3: automotive glass, in particular windscreens.

The arguments advanced (for example by the experts on 21.04.05) are long on theory and sectional interests but notably short on facts. Industry practices and the real degree of application of existing legislation and regulation are as important as possible gaps in the legislation and regulations themselves. We therefore proposed to address the following issues:

- What measures (legislative and other – such as type approval of vehicles and homologation of parts by vehicle manufacturers, the traceability of parts, product classification for consumer information and clarity of choice) are used in Europe, in order to ensure product, consumer and road safety in the use of motor vehicles ? How are these measures and controls applied in reality?

- Who vouches for and ensures the quality, structural integrity and safety (where appropriate) of spare parts, whether sold through the vehicle manufacturers' franchised dealers or through independent aftermarket channels, using what measures ?
- Can the origin of parts used in repairs be readily traced, so that responsibility for defects can be attributed ? How is this done in practice, in the vehicle manufacturer to franchised dealer (OES) channels and in the independent aftermarket (IAM) ?
- Are parts adequately described, defined and linked to vehicle identities (Vehicle Identifying Numbers, or VINs), given their multiple origins in the OES chain (multiple pressing and vehicle assembly plants, in different countries, both within and outside Europe) ? In the IAM supply chain ?
- Does the current self-certification process make it too easy for unscrupulous operators to sell sub-standard parts ?
- Are the existing measures (laws and regulations) adequate for protecting motorists and other road users from such risks ?
- What is the actual extent of safety problems with repairs ? Do they arise from the parts, from defective workshop practices, or both ? What evidence is there that spare parts from non-OE sources are less safe than those from OE sources ?
- How is the consumer informed of the categories of parts available to be specified for vehicle repair?
- Does the ability of independent (non-OE) aftermarket parts manufacturers and IAM distributors to compete and pass the benefits of Block Exemption onto consumers really prejudice safety?
- What additional measures (legal or other – such as standards or codes of conduct) are therefore needed to ensure the safety of consumers and others ? How should they be instituted ?

We undertook to deliver a balanced and documented assessment of the efficacy of current industry practices and legal instruments, together with the likely impact of the proposed directive, plus practical recommendations about how best to ensure product, consumer and road safety.

The scope of the study covers:

- Visible parts intended for the repair of body (collision) damage, i.e. those coming within the scope of design protection, in the three categories of body-integrated visible spare parts as mentioned above
- Light vehicles, i.e. passenger cars and light commercial vehicles (heavy commercial vehicles are not consumer goods, nor do they make the same use of visual design to appeal to customers for them)
- Conditions in the European Union, although we proposed to use specific national examples to illustrate effective or ineffective functioning

We conducted the project in stages, in order to be able to focus the effort on the most important issues.

In Stage 1, we documented the functioning of the collision repair market, including the actors, their roles, and how visible body parts are used and sourced. We identified the existing measures relating to the safety of light vehicles and to that of spare parts used in collision repair. We assessed their adequacy, including the effects of the Block Exemption Regulation and the proposed directive. We described the major gaps in protection that result.

This initial view was based on our knowledge and experience of the UK crash repair market, historically one of the most structured and yet open to non-OE parts in Europe. It involved a combination of the existing knowledge and expertise of members of the study team, documentary (desk) research, and a limited number of interviews in the industry with

- The customer service (parts and service) divisions of vehicle manufacturers, in order to understand their homologation, quality assurance and parts tracing procedures
- Independent parts distributors and components suppliers, for the same reasons
- Insurers (the major customers of the crash repair industry – although they only very rarely buy parts themselves, delegating this role to the repairers), body repair shop federations and estimating systems houses, in order to document the frequency, nature and severity of failures (of parts and procedures)

The output of Stage 1 enabled us to identify the apparent nature and scope of the problems and shortfalls and thus to focus the effort in Stage 2 on the critical issues.

In Stage 2 we identified and described the problems the European crash repair and insurance sectors encounter with the quality, structural integrity, dimensional conformity and safety of body repair parts, and the measures that have been taken so far or planned, in order to rectify these. We assessed the adequacy of those measures and identified the principal gaps that need to be closed.

This was based on evidence from the crash repair sector, based on requests for documentation and interviews with selected participants. We also conducted a review of technical documentation on the role of body parts in safety, from Europe and the United States, and interviewed experts in this field.

In Stage 3 we reviewed the available evidence, from Europe and elsewhere, as to the role of visible body parts in the protection of vehicles, their occupants and third parties. We identified which aspects of parts quality have a significant effect on safety. We estimated the scale of the problems and their potential human and economic consequences. We pinpointed the shortfalls in standards and enforcement measures and what needs to be done about them.

Our findings, conclusions and preliminary recommendations are documented in this report. Our sources of information, documentary and through discussions, are listed in Appendix 9. This investigation was conducted in a relatively brief space of time (2 months for the initial draft report plus 1 month for revisions and the final version). Consequently we could not access all possible sources of information or contact all those with an interest in the outcome – the protection of vehicle occupants and third parties, body repair and the supply of replacement parts for it are vast subjects, with many involved and interested parties. We have therefore striven to use defensible logic and sufficient evidence to reach balanced conclusions. We are grateful to all those in and around the sector who have helped us with our enquiries. We have tried to maintain an appropriate balance between the needs of "lay" readers, unfamiliar with the sector, and those involved in it, with deep technical knowledge.

2. Safety legislation and regulations

There are 2 types of safety legislation and regulations in the EU: one which applies to all kinds of products alike and one – more important in practice for the automotive industry – which is specifically tailored to the automotive industry, covering both whole vehicles and spare parts.

2.1 General safety legislation

All potentially unsafe products come under the scope of the Product Liability and General Product Safety Directives. The definitions that follow are taken from a presentation made to FIGIEFA by Dr Funke of Osborne Clark.[1]

2.1.1 General product liability

The Product Liability Directive (Directive 85/374/EEC, as amended by Directive 1999/34/EC and as implemented by the member states) imposes financial liability to encourage production of safe goods. Injured parties may recover damages from a manufacturer who placed faulty goods on the market. This liability is independent of contractual ties or fault (negligence). A manufacturer who produced the defective goods, or the defective component of the goods, or resells it under his own name or trademark can be held liable. Exceptions from liability are granted where a defect could not have been recognized, the goods were not defective when sold, or the product was not intended for resale. The Directive has been implemented by the member states (beginning in 1985). Product liability has become an integral part of national law of torts, although details vary between member states.

2.1.2 General product safety

The General Product Safety Directive (Directive 92/59/EC until 15 January 2004, Directive 2001/95/EC since then, as implemented by the member states) imposes general obligations on manufacturers to place only "safe" products on the market; to monitor safety of marketed products; to inform authorities of any dangers; and to take appropriate action in a crisis. Product safety is not about civil liability, but about risk prevention & management. The Directive applies to "products", i.e. goods intended for consumer use, goods of which consumer use can be reasonably foreseen (car owner DIY repairs, for example) and goods used to provide services to consumers. Only "safe" products are to be marketed, presenting only minimum risks, consistent with a high level of protection for health & safety. The main obligations are placed on the producer, i.e. EU manufacturer, a non-EU manufacturer's EU importer or representative, a reseller using its own name or trademark, or a distributor with influence on safety (i.e. for goods sensitive to transport/storage conditions).

[1] Preparing for "The day after tomorrow". European Product Safety Law and the motor vehicle sector. Presentation to FIGIEFA by Dr. Thomas G. Funke LL.M., Osborne Clark

A distributor has fewer obligations, being defined as a member of supply chain <u>without</u> influence on the safety properties of the product. The obligations are to place in the market only goods which are safe under all reasonably foreseeable conditions; to assure safety by means of design, testing, manufacturing process, adequate packaging and transportation, proper storage and distribution, and labelling and instructions for use. The producer must take measures to register and handle complaints in such a way as to stay aware of any dangers (establish reporting system up the supply chain, sampling). The producer must ensure that defective goods are traceable (labelling, tracking data on distribution). Both producers and distributors must inform the authorities if they conclude that one of their products is dangerous.

When a product is marketed internationally, rapid exchange of information between authorities and the Commission is ensured by RAPEX. When necessary, the public must be informed. When a product has been recognized as presenting a danger, it must to be taken off the market. Members of the supply chain and consumers need to be warned adequately. When necessary, products must be recalled. If the producer fails to act, public authority steps in. When a producer or distributor fails to comply with obligations, the authorities can take the necessary actions themselves (including warnings, recalls) and can impose substantial fines. The European Commission can take measures in cross-border cases. Infringements may lead to imprisonment.

Details are to be dealt with under national laws, which may differ slightly from one another, for example the German "Geräte- und Produktsicherheitsgesetz", UK "Consumer Protection Act" and "General Product Safety Regulations". Directive 2001/95/EC was due to be implemented by 15 February but several member states are running late.

All spare parts within the scope of this study, i.e. categories 1- 3, come under this Directive and are sanctioned if they do not comply with the requirements laid down.

To anyone familiar with the automotive industry, there is very little new in all of this, except perhaps the last two provisions: the Commission taking measures in cross-border cases and the possibility of infringements leading to imprisonment. But nowhere in all this is there any protection of consumers against poor *services*, including repairs to vehicles. These do, however, exist in some national legislation, for example Duty of Care and Corporate Manslaughter in the UK. The repairer bears the front-line responsibility for the safety of repairs and of the parts used in those repairs. These provisions could, however, also be invoked against a motor insurer, were one seen to have forced one of its approved body repairers to use defective parts, or failed to ensure its competence for carrying out safe repairs, in countries where insurers have direct relationships with repairers and approve them.

<u>*2.2 Existing safety regulations for the automotive industry*</u>

2.2.1 Type approval

Vehicles are only allowed onto EU roads when they have received a Type Approval. The objective of the EU type-approval regime is "to ensure a high level of road safety, health protection, environmental protection, energy efficiency and protection against unauthorised use". Thus it aims at and includes the subject matter of this study: product safety, consumer safety and road safety.

The starting point and legal basis for a prolific regulatory framework on safety that has accumulated over the years is Council Directive 70/156 EEC, adopted in 1970. Because this Directive has undergone more than 18 amendments over time, the Commission has decided to recast it in the interests of clarity. To this end it presented in 2003 a proposal for what is now called the *Framework Directive.* This has now undergone two recasts.

Its first stage – the technical annexes – has already been completed with Commission Directive *2001/116 EC* by way of adaptation. Its second stage – the general rules – in its amended form was adopted by the Council of Ministers. No material issues being contentious any more, it is safe to assume that this piece of legislation will come into force soon. It seems therefore appropriate for the purposes of this study to refer to the provisions of that Framework Directive (FD for short).

2.2.2 *How spare parts are covered and integrated in the regime*

In Europe, the safety of spare parts has always been dealt with and regulated in the context of the safety of complete vehicles. The FD is used to regulate the safety of both new motor vehicles and vehicle components – irrespective of whether the components are used for vehicle assembly or for being marketed as spare parts. This approach has been used for decades and will continue to be used in the future.

In the context of type approval the term "spare part" is in fact not explicitly used. Instead, the FD distinguishes between

- *Components,* defined as "a device intended to be part of a vehicle, which may be type-approved independently of a vehicle",

and

- *Separate technical units,* defined as "a device intended to be part of a vehicle, which may be type-approved separately but only in relation to one or more specified types of vehicle."

In practice, regulatory measures deal with these two categories in the same way. The term "spare parts", as used in this discussion, therefore covers both categories. Most of the provisions of the FD apply to motor vehicles and spare parts alike. Some are specifically tailored to vehicles, some refer and apply exclusively to spare parts.

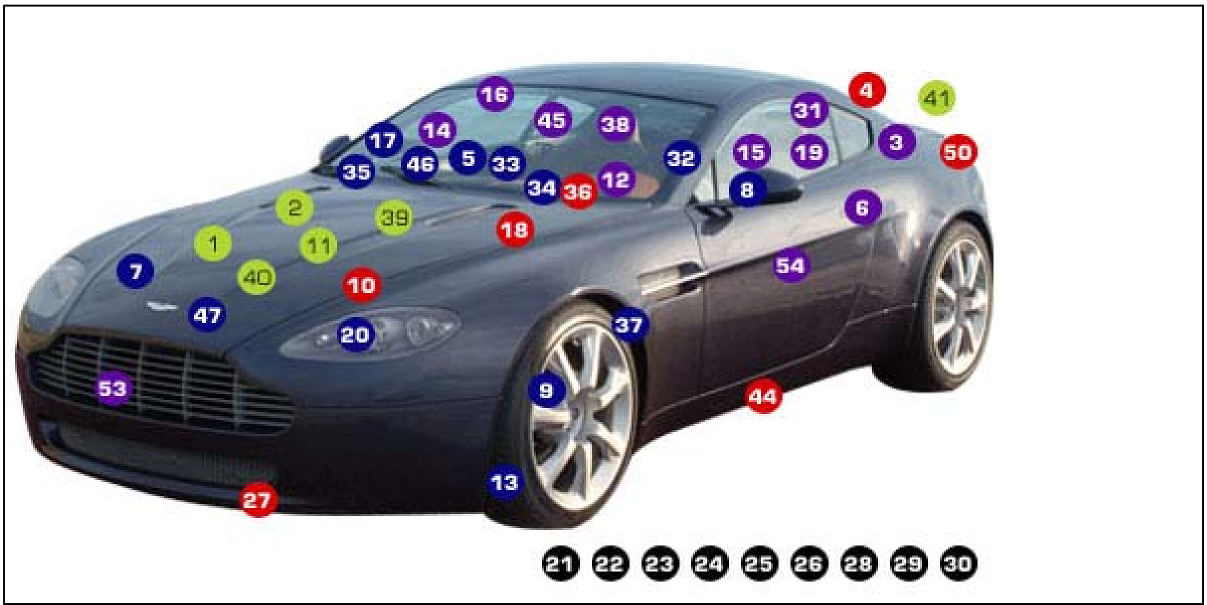
2.2.3 ***Common safety standards and regulatory acts***

In order to implement the principle of total harmonisation across Europe, the regime first of all needs a common and objective safety standard for each safety-critical part or category of parts. This is achieved by special regulatory acts, that is by

- Individual EC Directives or Regulations
- And UN/ECE Regulations

The latter are based on the Agreement of the United Nations Economic Commission and form an integral part of the EC type-approval regime. In many cases, EC and UN/ECE regulations cover the same subject matter and overlap; in certain instances they diverge (but nevertheless are binding). There are at present 58 EC-Directives and 57 UN/ECE Regulations in force in the Community. They cover parts such as lighting, brakes, automotive glass, seat belts, tyres, etc. Figure 2.1 shows the individual vehicle functions subject to separate approval. Figure 2.2 lists the individual approvals and the EC directives that cover them.

Figure 2.1
Individual vehicle functions



A number of specific directives concern parts that are involved in the outer visible styling of the vehicle:

16. Exterior projections
45. Safety glazing
22. Side, rear and stop lamps
23. Direction indicator lamps
25. Headlamps

Figure 2.2
Individual approvals and directives

Environment

01. Sound Levels EC 1999/101
02. Emissions EC 2003/76
11. Diesel Smoke EC 2005/21
39. Fuel Consumption EC 2004/3
40. Engine Power EC1999/99
41. Diesel Emissions 2001/27/EC

Active Safety

05. Steering Effort EC 1999/7
07. Audible Warning EC 70/388
35. Wash/Wipe.EC 94/68
13. Antitheft EC 95/56
32. Forward Vision EC 90/630
17. Speedometer and Reverse Gear EC 97/39
08. Rear Visibility EC 88/321
46. Tyres EC 2005/11
34. Defrost / Demist EC 78/317
09. Braking EC 2002/78
20. Lighting Installation EC 97/28
33. Identification of Controls EC 94/53
37. Wheel Guards EC 94/78

Passive Safety

19. Safety Belt Anchorage EC 2005/41
16. Exterior Projections EC 79/488
15. Seat Strength EC 2005/13
14. Protective Steering EC 91/662
03. Fuel Tank EC 2000/8
12. Interior Fittings EC 2000/4
31. Safety Belts EC 2005/40
06. Door Latches and hinges EC 2001/31
38. Head restraints EC 78/932
45. Safety glazing EC 2001/92
53. Frontal impact EC 1999/98
54. Side impact EC 96/27

Lighting Equipment

21. Reflex Reflectors EC 97/29
22. Side, Rear and Stop lamps EC 97/30
23. Direction indicator lamps EC 1999/15
24. Rear registration plate lamp EC 97/31
25. Headlamps (including bulbs) EC 1999/17
26. Front fog lamps EC 1999/18
28. Rear fog lamps EC 1999/14
29. Reversing Lamps EC 97/32
30. Parking Lamps EC 1999/16

Other Directives

27. Towing Hooks EC 96/64
10. Radio Interference Suppression EC 95/54
04. Rear Registration Plate EC 70/222
18. Statutory Plates EC 78/507
36. Heating systems 2004/78
44. Masses and Dimensions EC 2003/19
50. Mechanical Couplings EC 94/20

Of these, only 16 (exterior projections) directly concerns pedestrian impact, prohibiting bodywork shapes that are excessively wounding. Items 53 (frontal impact, EC 1999/98) and 54 (side impact, EC 96/27) are whole vehicle safety standards for the protection of its occupants, with conformity established through whole vehicle impact tests. These are paralleled by the EuroNCAP impact tests, which are technically slightly different and not mandatory, although often referred to in manufacturers' publicity for their vehicles, when these obtain favourable ratings. The full list of EU and ECE directives is provided in Appendix 1.

Figure 2.3
Areas of pedestrian impact

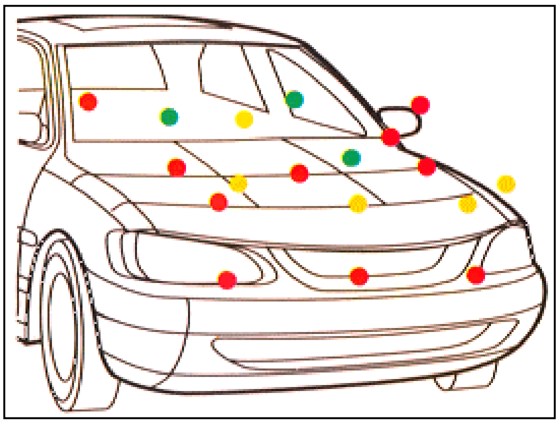
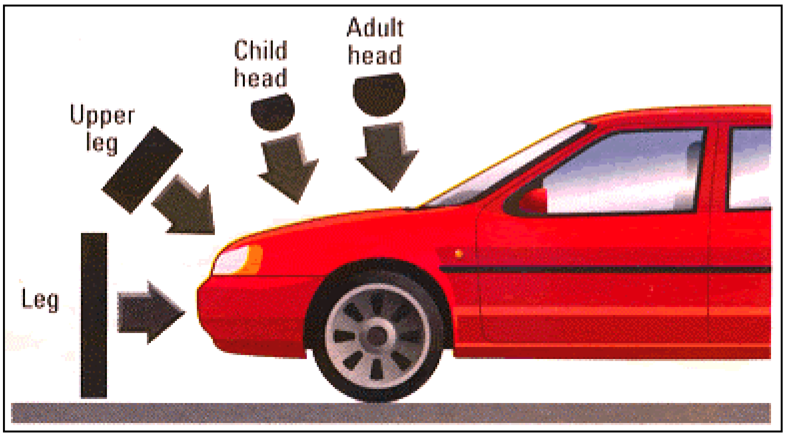


Figure 2.4
Pedestrian impact simulations



Until the 2003 Pedestrian Safety Directive, therefore, there was no explicit type approval or regulation of the safety of outer body parts coming under Design Protection, other than those (such as lights) regulated for other safety reasons, or bumpers (low temperature shatter-resistance standard) or outside rear-view mirrors (regulated for optical properties but also for pedestrian impact). They were and are of course involved in the whole vehicle crash tests for occupant safety but had little or no influence on the results, except for bonnets with the NHTSA windscreen penetration standard. The reason was simple: there was no observed or suspected safety problem involving them (this subject is further developed in Section 3). This perspective is completely changed with pedestrian safety. Figure 2.3 shows the areas of pedestrian impact that are subject to the Directive. Figure 2.4 shows the set of simulated impacts that are carried out, using instrumented partial dummy figures, to test the forces and accelerations imposed upon them in collisions with specific parts of the vehicle. Without entering into detailed technical discussions, the yield properties of these parts must be consistent with pedestrian protection standards. This goes beyond the already existing requirements that outside body parts must not show dangerous asperities, or that plastic bumpers must not shatter on impact down to low temperatures.

2.2.4 Development of safety measures

Each of these Directives and Regulations is developed and applied in the following rigorous fashion, involving three stages:

1. A thorough evaluation of the safety aspects involved
2. The development, definition and prescription of the *technical requirements* the pertinent part must fulfil, in order to be considered safe
3. The development, definition and prescription of the *test procedures* for verifying whether the part truly conforms with the technical requirements that have been set

Depending upon the particular case, the regulatory measures can involve wide-ranging consultation and may go deeply into details. This approach ensures that safety standards applied in the EU are based on broad expert input and that they are objective, comprehensive and effective.

2.2.5 Community-wide and uniform application

The mechanism to ensure that these standards are uniformly implemented and that safety-relevant parts can be easily and freely sold within the Community is the EC Type Approval Procedure. This operates through the principle of delegation, whereby a Member State certifies that a type of vehicle, system, component or separate technical unit satisfies the relevant administrative provisions and technical requirements of the FD and of the regulatory acts listed in the relavant Annexes to it. Any Member State must grant an EC Type Approval and issue an EC Type Approval Certificate[2] for any spare part that comes under the regime and conforms with the requirements set out in the FD and its accompanying legislation[3]; and all

[2] This is the certificate set out in an Annexe to this Directive or in the corresponding annex to a separate directive or regulation, or the communication form set out in the relevant Annexe to one of the UN/ECE Regulations listed

[3] There is one exception: where the Member State can – for a maximum period of six months – refuse to grant the approval, if it finds that the part presents a serious risk to road safety or seriously harms the environment or public health

other Member States must accept this approval, i.e. they must "permit the sale or entry into service" on such part on their territory. This reciprocal recognition enables the establishment of a single market and equal safety for all EU road users. The application can be submitted only in one Member State. In case of a dispute between Member States, the Commission is called upon to mediate. Following the subsidiarity principle, Member States may continue to issue national type approvals related to issues which are not pre-empted by EU legislation. Such approvals, however, are strictly limited to the territory of the acting Member State and thus do not provide Community-wide and uniform application.

The key role for administering this compulsory mechanism of mutual inter-state cooperation rests with the Approval Authories[4] one of them to be set up in each Member State. Such an authority may be part of a governmental department (as is the case e.g. in Belgium, the Czech Republic, Italy and Spain) or may be a commissioned governmental body (as is the case e.g. in Germany (KBA), France (UTAC), Netherlands (RDW) or U.K. (VCA)). Moreover, Member States may designate Technical Services,[5] which are to assist and advise the Type Approval Authority in all technical matters involved. Such services – for example TRL, CPA, DEKRA, IDIADA or TÜV – must provide a certain degree of proficiency which is carefully assessed and reviewed every 3 years. A full list of Approval Authorities and Technical Services is available on http://ec.europa.eu/enterprise/automotive/pagesbackground/technical_services.htm

Member States, in granting an EC type-approval, are obliged to make sure that the prescribed requirements, both substantive and formal, are met in each particular case. This includes for example:

- Checking whether the pertinent safety standards are complied with
- Demonstrating this by means of an appropriate test performed by designated Technical Services
- Continuously monitoring whether there is conformity of production parts with the sample parts tested.

[4] Approval Authority means the authority of a Member State with competence for all aspects of the approval of a type of vehicle, system, component or separate technical unit, or of the individual approval of a vehicle, for the authorisation process, for issuing and, if appropriate, withdrawing approval certificates for acting as the contact point for the approval authorities of other Member States; for designating the technical services and for ensuring that the manufacturer meets its obligations regarding the conformity of production

[5] A Technical Service means an organisation or body designated by the Approval Authority of a Member State as a testing laboratory to carry out tests, or as a conformity assessment body to carry out the initial assessment and other tests or inspections on behalf of the Approval Authority, it also being possible for the Approval Authority itself to carry out these functions itself.

As an example, the VCA (Vehicle Certification Agency) is the government agency that fulfills this role in the UK. The text below is taken from the VCA's Website.[6]

Type approval for cars. *Many industrial sectors are subject to some form of approval or certification system but road vehicles are a special case, because of their importance to and impact upon society, and have been subject to specific technical standards almost from their first invention. Within Europe, two systems of type approval have been in existence for over 20 years. One is based around EC Directives and provides for the approval of whole vehicles, vehicle systems, and separate components. The other is based around ECE (United Nations) Regulations and provides for approval of vehicle systems and separate components, but not whole vehicles. Type approval is the confirmation that production samples of a design will meet specified performance standards. The specification of the product is recorded and only that specification is approved.*

Automotive EC Directives and ECE Regulations require third party approval - testing, certification and production conformity assessment by an independent body. Each Member State is required to appoint an Approval Authority to issue the approvals and a Technical Service to carry out the testing to the Directives and Regulations. An approval issued by one Authority will be accepted in all the Member States. VCA is the designated UK Approval Authority and Technical Service for all type approvals to automotive EC Directives and ECE Regulations.

Whole vehicle type approval. *EC approval of most road vehicles is based around a "Whole Vehicle" framework Directive 70/156/EEC (as amended by 2001/11/6/ED) and this specifies the range of aspects of the vehicle that must be approved to separate technical Directives. Hence, in order to gain EC whole vehicle approval, a vehicle first will have to be approved for e.g. brakes, emissions, noise, etc – up to 48 different standards for the typical car. The issuing of the whole vehicle approval does not in itself involve testing, but a production sample of the complete vehicle is inspected to check that its specification matches the specifications contained in all the the separate Directive approvals.*

System or component approval. *The separate technical Directives and Regulations allow (or require) the approval of individual systems as part of a type of vehicle and some allow for the approval of separate devices. A separate device may be approved either as a Separate Technical Unit (STU), in which case the vehicle to which it is to be fitted must be declared, or as a Component if it can be fitted to any vehicle. System and component approval requires that a sample of the type to be approved is tested by the Technical Service to the requirements of the relevant Directive. Its technical specification is documented and that specification forms part of the approval.*

Conformity of production. *In applying for the approval certificate to be issued by VCA, one important requirement in the Type Approval Regulations is Conformity of Production (COP). COP means the ability to produce series product in conformity with the specification, performance and marking requirements in the type approval. Whether you are a UK manufacturer, or the UK agent applying for approvals on behalf of a manufacturer outside the UK, and whatever your product is, suitable COP arrangements must be made. VCA has*

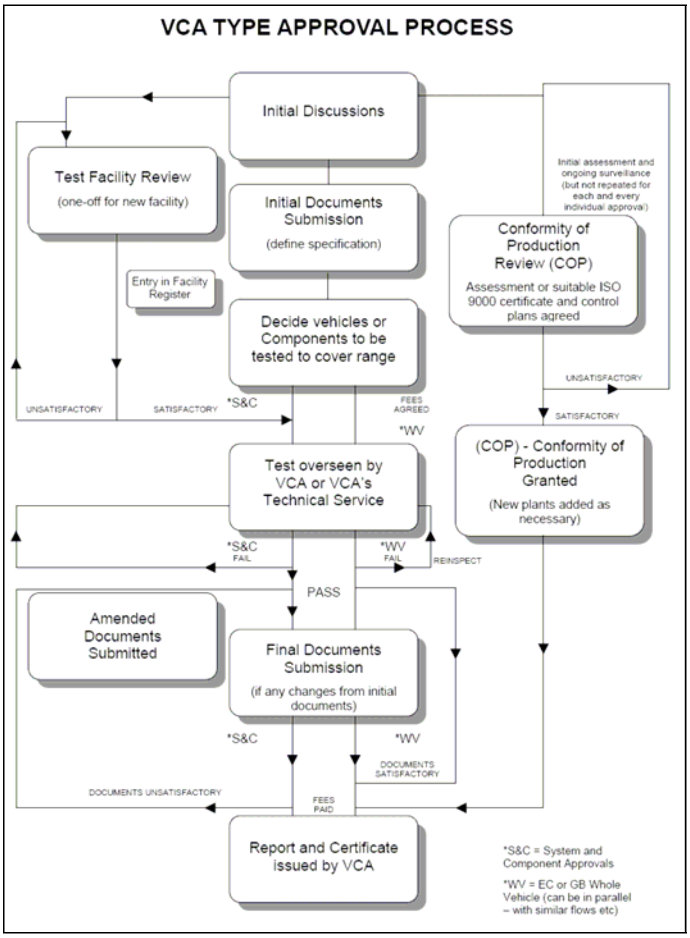
[6] www.vca.gov.uk

a specialist group, whose function is to assess manufacturers' quality systems and procedures, in order to see that two key conditions of most type approval standards are met:

- *To verify that before an approval is issued, there are robust controls in place to ensure that all products made conform to the approved type*
- *To monitor periodically that the controls remain effective during the life of the approval.*

The VCA website shows the VCA's type approval process diagrammatically (Figure 2.4)

Figure 2.4



2.2.6 Policing and sanctions

The EU's type-approval regime is not only elaborated on the merits but is also armed with strong enforcement tools; it is no paper tiger. The main policing instruments available are these:

Marking and transparency: if a spare part is subject to and has been granted an EC Type Approval, each individual unit that is offered for sale in the EU must carry the relevant EC Type Approval Mark. The numbering of the mark is designed in a way that discloses which Member State has issued the type-approval. By means of this other Member States can easily clarify non-compliance issues with the Member State in charge and distributors, repairers and consumers can easily trace the supplier of the spare part in question.

Should the EC mark, unlawfully, not be affixed to units offered for sale then all Member States can stop the distribution of such parts (and impose additional sanctions), and can prevent the use of such parts (if already mounted) in the course of a roadworthiness inspection.

Conformity of production: the manufacturer of a spare part is liable and responsible for ensuring conformity of production. This means it must guarantee that the units produced and sold in series conform to the samples which were submitted and tested for the type approval procedure. This requirement applies equally to EU manufacturers and to manufacturers and production sites outside the EU.

Conformity of production is continuously monitored by the approval authorities based on detailed guidelines. One of the verifying methods frequently used is that an inspector comes to the factory site, takes several units at random out of the going production and has a Technical Service check whether they match with the samples originally submitted. If they fail to do so, the Approval Authority takes the appropriate steps up to the withdrawal of the type-approval which, in the circumstances, may be tantamount to closing the manufacturer's business.

Penalties: apart from the above measures, which are highly effective for economic reasons, the Member States are obliged to impose penalties for infringements of this regulatory framework. These penalties must be effective, proportionate and dissuasive, and usually consist of administrative fines.

2.2.7 Effectiveness

The Type Approval approach has been used and has evolved for more than 45 years and has proved to be effective and robust. The FD simply encapsulates that progress in a more manageable form. The Type Approval regime, covering both complete vehicles and spare parts can be characterised as follows:

- It is well tried and tested, because it has been in continuous development over an extensive period, building on prior experience in individual Member States and has been permanently refined in the course of its expansion
- It is effective in substance, because its requirements are strictly technical (and not political or commercial) and are specifically tailored to the "safety" exigencies of each part or categories of parts involved, based on profound expert input
- It is effectively policed because there are high hurdles for getting an approval and severe sanctions for non-compliance; and because the regime applies to EU- and non-EU parts producers alike

- It is neutral with respect to competition because everybody has access to the approval systems on equal terms[7] so that any parts manufacturer, if it complies with the approval requirements, is able to compete in the aftermarket (one of the main objectives of Block-Exemption-Regulation No. 1400/2002)
- It is flexible because it is able to respond to new technological developments without changing its basic structure too. If additional parts are considered to be safety-critical they can be subjected in into the type-approval , with additional flexibility now provided by the new authorisation system (see below).

Type Approval is a fine example of pan-European cooperation between public authorities and the automotive industry and of the effective practice of subsidiarity. It has clearly brought considerable benefits, in terms of innovation in secondary safety and a substantial consequent reduction in deaths and the severity of injuries that inevitably result from road accidents.

2.3 The new Authorisation Scheme for parts and equipment

Subsequent to its 1st reading in the European Parliament the Commission proposed to amend the Framework Directive by Article 29A. This article provides for the establishment of an Authorisation Scheme which is to cover parts or equipment, which can pose a significant risk to the correct functioning of systems that are essential for the safety of the vehicle or its environmental performance.

Although neither parts nor equipment are explicitly defined, it is fairly obvious that all kinds of replaceable vehicle components – including those which gave rise to this study – potentially come within the range of this provision. However, unlike the Type Approval regime, which regulates components also used for vehicle assembly, Art. 29A covers them only where used as spare parts in the aftermarket. The intention is clearly to try to ensure that vehicles on the road are kept as safe and environmentally compatible as those newly registered[8]. The core provision of Article 29A is simple and clear. The sale of safety-critical spare parts (or accessories) in the EU shall only be allowed if the pertinent part has been authorised by an Approval Authority.

The authorisation process as such is practically identical with the type approval procedure: safety standards and test procedures have to be defined; the key players

[7] There is a certain regulatory advantage for the vehicle makers: components that are already covered by a type-approval of the new vehicle or are "original parts" are, in principle, exempted from separate approval.

[8] See Recital (11 A): "The main objective of the approval legislation on vehicles is to ensure that new vehicles, components and separate technical units put on the market provide a high level of safety and environmental protection. This aim should not be impaired by the fitting of certain parts or equipment after vehicles have been placed on the market or have entered service" in connection with Recital (11 B) *(emphasis added)*

in charge – Approval Authorities and Technical Services –are the same; the requirements for applying for and granting a safety certificate are identical; marking of each unit sold is provided for; and the policing measures (including conformity of production) will be equivalent[9].

The only and crucial difference is a procedural one: under the Type Approval regime the part-specific safety requirements are defined and prescribed in a Directive or (UN/ECE) Regulation. Under the Authorisation regime these requirements will be defined and prescribed by the Commission, assisted by a Technical Committee, in the course of a Comitology procedure: The regulatory measures issued this way on the basis of conferred power are of "normative content" and thus legally binding to the same degree as a Directive or Regulation[10]. Assuming that Art. 29A will be finally adopted, the EU legislator will have an option in the future: a spare part which is considered to be safety- (or environmental-) critical may be subjected either to a Type Approval or to an Authorisation procedure.

Since Directives always have to pass a co-decision procedure, an advantage of the Authorisation regime should be that it allows a quicker reaction to upcoming technological changes and to accelerate law making. This, however, does not release the Commission and the Technical Committee from the duty to proceed within the guidelines set by Parliament which means, inter alia, carefully to evaluate the seriousness of the risk to the safety, the proportionality of the regulatory measures provided and the effect on consumers and manufacturers in the aftermarket[11]. The unspoken question remains: how transparent, representative and balanced are the proceedings and constitution of the Technical Committee ? The composition of the Technical Committees must reflect the different interests of the market.

2.4 Overall evaluation

Existing European legislation provides effective instruments for ensuring the safety of spare parts, to the same degree as is required for complete vehicles. This does not of itself solve the problem of how to reconcile maintaining safety with ensuring an appropriate level of competition in the aftermarket for body repair parts. As demonstrated in the next section, one critical aspect is the correct segmentation of safety, repairs and parts, in order to define the right scope of application for safety measures.

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[9] This being so, one may wonder why paragraphs 4-7 of Art. 29A, which – partly in short form – repeat the various requirements mentioned, are not summarised in a short provision saying that the provisions related to the type-approval of components and separate technical units apply *mutatis mutandis* to the authorisation process.

[10] See Council Decision 1999/408/EC of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission (OJ L 184, 17.7.1999, 23). The Decision is currently in the process of being amended (see Amended Proposal of 22.4.2004 – COM (2004) 324 final).

[11] See Art. 29 A (1) FD.

3. Assessment of safety issues

3.1 The concept of safety

Road safety is a very serious matter, both morally and economically. Therefore any question relating to it must be taken seriously. The public authorities and the automotive industry have made enormous investments in improving the intrinsic safety of vehicles, that of the infrastructure, and the way in which road users make use of both of these. Considerable progress has been made, particularly in reducing the number of accidents and their consequences for the occupants of vehicles. Attention is now shifting from frontal collisions to side impacts and from occupant protection to that of other road users (pedestrians, cyclists, motorcyclists). There are inevitable tensions between the consumer and public authorities, pressing for more safety features in vehicles, and the automotive industry, which produces vehicles under intense competitive price and cost pressures and for which safety is most often not an aspect easily saleable to consumers. The problem of conflicting public objectives, notably between vehicle safety (generally requiring more size and mass) and fuel consumption and environmental protection (requiring less mass) and the need to have objective, consistent and stable regulation was at the core of the CARS 21 project.

A legal definition of safety is hard to find. A standard definition could be 'The condition of being safe; freedom from danger, injury or risk'. It is quite obvious that safety cannot be absolute, as the world is an inherently unsafe place. Nor is safety free of charge, particularly where safety features of vehicles are concerned. There are always trade-offs to be made and cost-benefit considerations apply. This is due to the enormous number of variables that any single event or a series of events are subject to. Therefore safety is an objective or intention to be striven for and not a permanent condition. This is an important philosophical step in understanding this subject, as in reality we are discussing aspects of what should more properly be defined as 'relative safety' or, in simple terms, risk.

Risk is a statement of mathematical probability and is normally expressed in comparative terms. As there are an enormous number of variables in most human activities it is therefore subject to a very great deal of interpretation of definition. It is therefore common practice in risk assessment to consider both the severity of an event and also the probability of it occurring. In risk assessment studies these two factors are often combined to form a final composite number. For example Event A has a severity of 1 (only a slight negative impact) and a probability of 10. Therefore in combination this is 1 x 10 which equals 10. Event B could be much more negative and therefore have a severity of 10, but could be more unlikely to occur and have a probability of 1. Therefore in combination this is 10 x 1 which also equals 10. By comparison Event B is therefore equivalent in terms of 'risk' to Event A. This principle is important as whilst an event may be highly injurious it may be so unlikely that it effectively constitutes a low risk.

Road Safety is a most complex subject as it brings together a number of societal and technical aspects. The UK Department for Transport (DfT) report into Road Safety entitled 'Tomorrow's Roads, Safer for everyone: the First Three Year Review' identifies seven key thematic areas:

- Theme 1 - Safer for children
- Theme 2 - Safer drivers - training and testing
- Theme 3 - Safer drivers - drink, drugs and drowsiness
- Theme 4 - Safer infrastructure
- Theme 5 - Safer speeds
- Theme 6 - Safer vehicles
- Theme 7 - Safer motorcycling

Within the detail of this report a number of key UK Government Research Programmes are identified. These research programmes are designed to improve understanding of the key drivers of Killed and Serious Injuries (KSI) in these areas, and cover a wide range of topics such as: pedestrian training schemes, road safety codes, speed camera siting and policy, media campaigns and education programmes; and also more technical approaches to vehicle design. Within the technical design areas there are specific design and regulatory research programmes which include the EuroNCAP[12] and EEVC regulatory developments. Subsets of these technical research programmes are Primary and Secondary Safety.

The UK DfT defines Primary safety as '*those vehicle engineering aspects, which can "as far as possible reduce the risk of an accident occurring"*'. The theme has three sub-categories; vehicle braking and stability, vision/conspicuity, and electronic'. Work in these areas is just beginning.

The Department defines Secondary Safety as '*all structural and design features that reduce the consequences of accidents as far as possible*'. It is made up of three sub-themes: biomechanics, structural crashworthiness and restraint/safety systems. These in turn cover specific topics such as the development of crash test dummies for use in regulatory testing, the crashworthiness of cars, EuroNCAP, air bags, seat belts and fixings, seating, child restraint systems and installation, interior fittings and safer car fronts (pedestrian protection).

3.2 Safety engineering

Some components of the vehicle are safety critical. In reviewing this area it is important to redefine what is meant by safety critical. A working definition could be 'those components which in their absence or failure would severely increase the risk (as defined above) of serious injury or death)'.

[12] For more about EuroNCAP, see "Creating a Market for Safety, 10 Years of EuroNCAP, European Car Assessment Programme 2005", downloadable from www.euroncap.com

It is widely understood by all experts and practitioners within the Secondary Safety arena that some parts of a vehicle can be extremely injurious to both occupants and vulnerable road users. These are normally characterised as 'stiff' components, in which the word 'stiff' is used to describe either the components' inability to conform to the shape of the occupant or vulnerable road user, or to be easily accelerated away from the occupant or vulnerable road user in a given high speed impact. For example, the dash panel needs to be engineered so as to minimise injuries resulting from impact of the knee against it.

Safety engineering is an enormously complex subject and whilst the engineers in the field are often working at the cutting edge of science and technology they are also working with relatively crude biometric measures. It is therefore not possible to predict exactly the injury caused by any particular component or system, but only to correlate tests done on cadavers and other biofidelic objects to injury prediction. The real test of these developments is therefore in the 'real world' and it is here that the real testament to the work of those working in the field can be seen. The combination of the introduction and use of seatbelts and the remarkable recent developments in secondary safety have produced real reductions in Killed and Serious Injury (KSI) numbers across Europe broadly in line with European targets for casualty reduction.

In interacting with occupants and vulnerable road users vehicles behave as a system. They are therefore predominantly tested for 'safety' as complete vehicles and it is impossible to remove a component and to claim that it is or is not 'safety critical'. What can be done is to assess those components which contribute in *greater* measure to the performance of the vehicle during interaction with its environment in an impact and to attempt to quantify the 'risk' of inadequate performance of those components. It is also possible to assess those components which contribute in only *slight* or *limited* measure to the performance of the vehicle in its interaction with its environment in an impact. Therefore in reviewing the actual and potential safety implications of "non-original" body repair parts, it is vital to segment them as a function of their role within the overall safety system. It is also essential to understand their role in the different categories of body repair that are carried out, as repair involves both parts and processes, either or both of which can create or increase risks in accident situations occurring after the repair has taken place.

3.3 Segmenting road vehicle safety

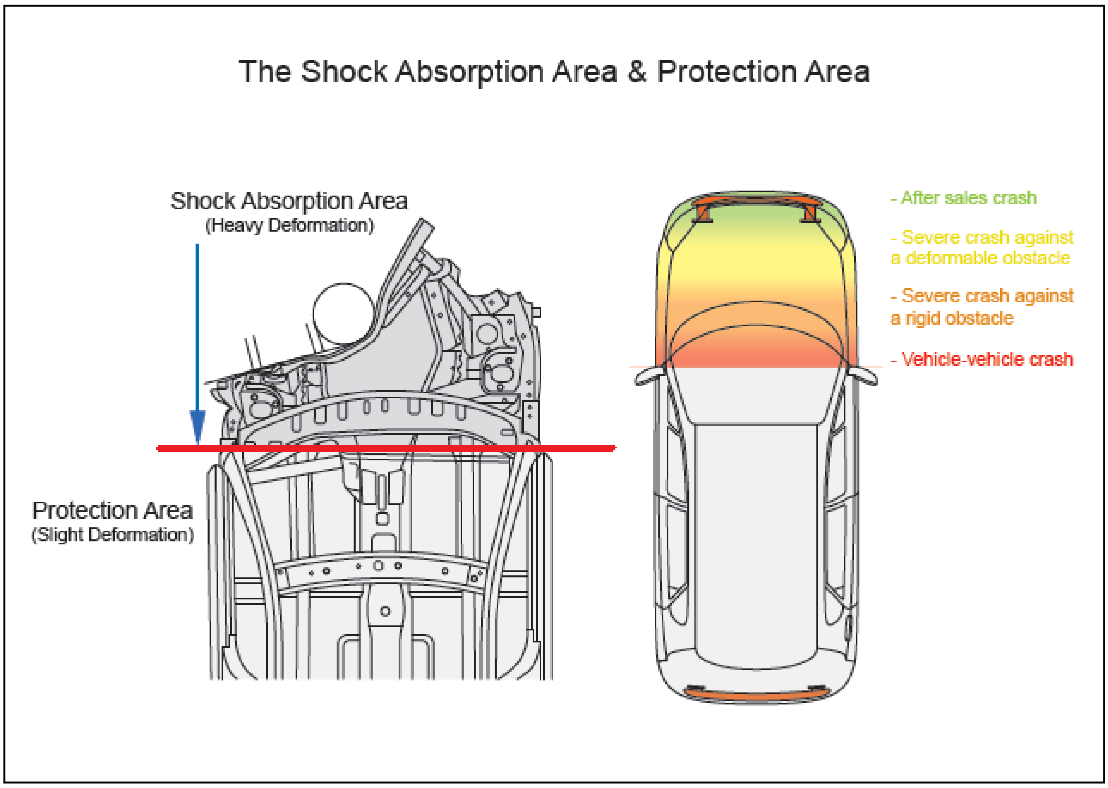
The primary distinction in terms of risks to road users is between those to the occupants of vehicles and those to other road users. With respect to occupant safety, light vehicles (primarily passenger cars) contain four principal elements:

1. The safety cell or cage, within which the occupants sit. This is designed to remain as intact as possible under impact, both to protect the occupants and to ensure that they can easily escape from the vehicle after it (doors not jamming). Within the cell, restraints (seatbelts, airbags) prevent or cushion the

impact of the occupants against the inside of the cell and its contents. Other airbags are used to cushion intrusions in the case of side impact

2. Given that the major source of injuries is from front impacts, the zone in front of the safety cell is constructed so as to dissipate the kinetic energy by controlled deformation, thereby transmitting as little as possible to the safety cell through a controlled set of pathways
3. Opening elements are designed against three objectives: not creating dangerous situations; protecting occupants against impact; and facilitating egress. Thus a bonnet must not spontaneously come unlatched (which could cause an accident). In the case of frontal impact, it must fold, in order not to be driven into the safety cell through the windscreen. Doors must not come unlatched spontaneously or under impact, in order to avoid the ejection of occupants. Nor must their closure mechanisms jam upon impact, preventing escape. They are commonly internally reinforced to prevent or lessen intrusion into the safety cell, in the case of a side impact. The side-impact reinforcements may be used as a channel for front-end impact energy
4. The outer extremities of the vehicle, which give it its shape and distinctive styling do not participate to a significant degree in the protection of the occupants. This is true for example of wings, bumpers (which are designed to protect the bodywork against scuffs, scrapes and only very minor impacts) and outer skins of doors.

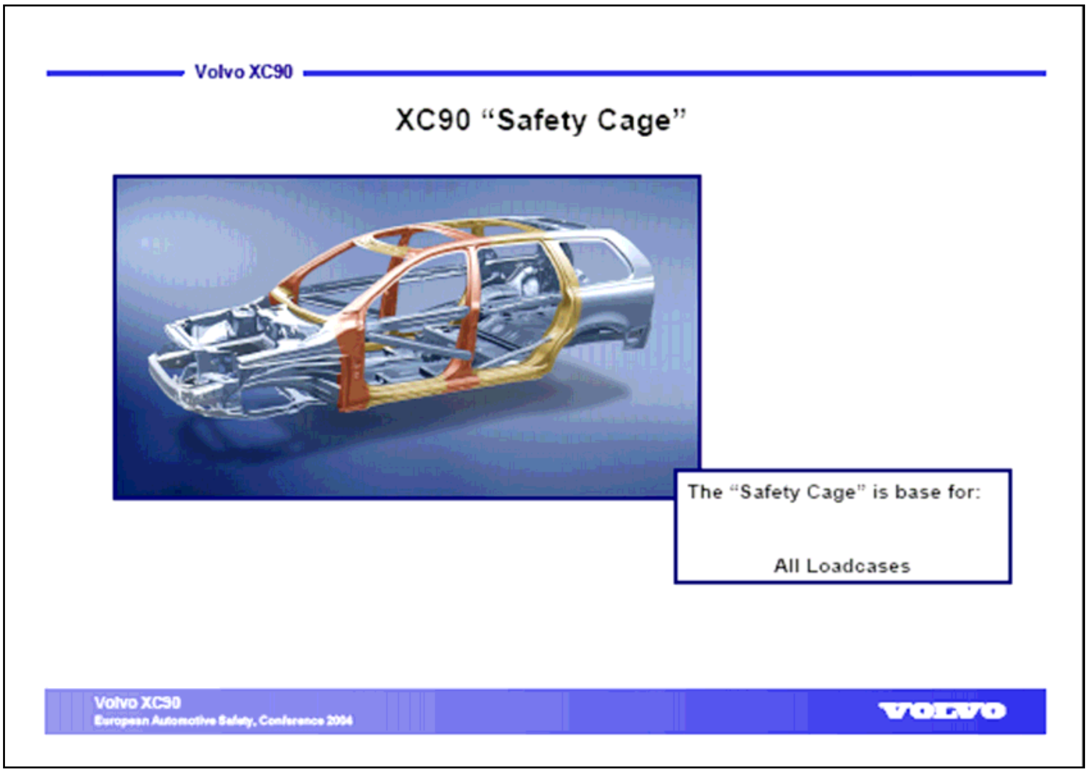
Figure 3.1



Source: adapted from Renault's presentation, Megane II Passive Safety, European Automotive Safety Conference, Bad Nauheim, October 26-28, 2004

The distinction between Elements 1 and 2 is clearly revealed in the drawing in Figure 3.1. The list on the right hand side ranks crashes in terms of their severity and how far their effects penetrate into the vehicle. Note the designation "aftersales crash" for the least severe, implying only the consumption of exterior, non-structural parts and of repair labour. Figure 3.2 shows the safety cage, identified in colour for a Volvo XC-90.

Figure 3.2
The safety cage



Source: European Automotive Safety Conference, Bad Nauheim, October 26-28, 2004

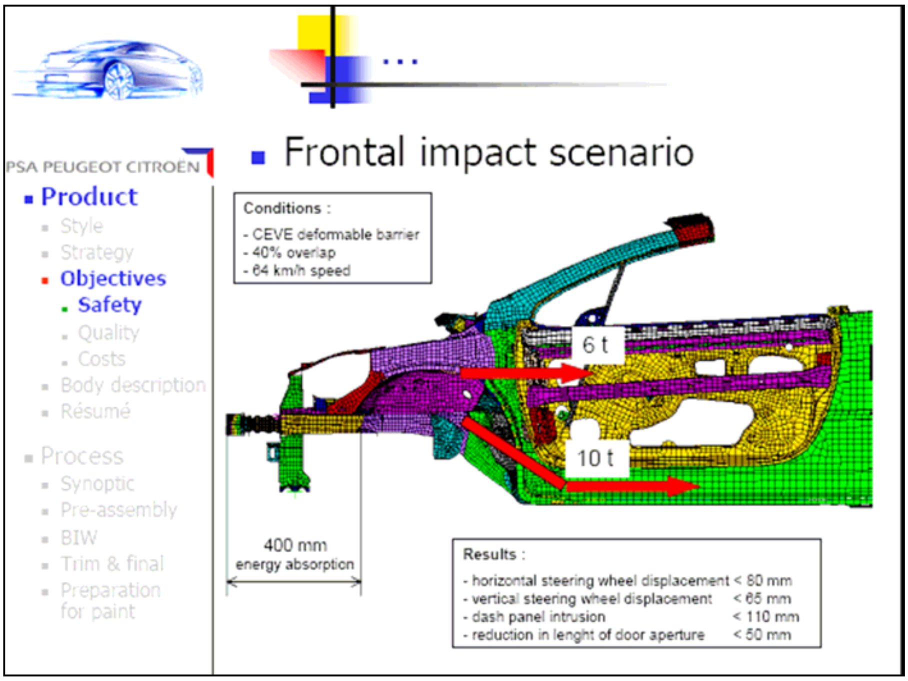
Figure 3.3 illustrates how major deformation is accepted in the shock absorption area, in order to ensure minimal movement within the safety cell. As the safety cell as a whole is nevertheless subject to strong deceleration in a front impact, the vehicle occupants are prevented from impacting the inside front of it features of it by restraints (seat belts and airbags). The design and performance of seatbacks is important in protecting them against violent acceleration in the case of a rear impact. Door reinforcements and lateral airbags protect against intrusion in a side impact – there is not enough space within the doors to replicate the front-end impact strategy of a deformation zone. Figure 3.4 sums up what automotive safety engineers consider to be the safety-implicated parts of the vehicle body structure[13]. Note the absence of outer, visible, styled parts, coming within the scope of Design Rights –

[13] Note also the openness of communication within the safety community at such conferences, and as indicated by the existence of the European Vehicle Passive Safety Network – there are multiple such diagrams shown in the different manufacturers' presentations to these conferences. This sharing of information greatly facilitates progress in reducing the consequences of road accidents.

except for some clearly structural elements, such as the A, B and C pillars (A along the sides of the windscreen, B between front and rear doors, C behind the rear doors.

Figure 3.3

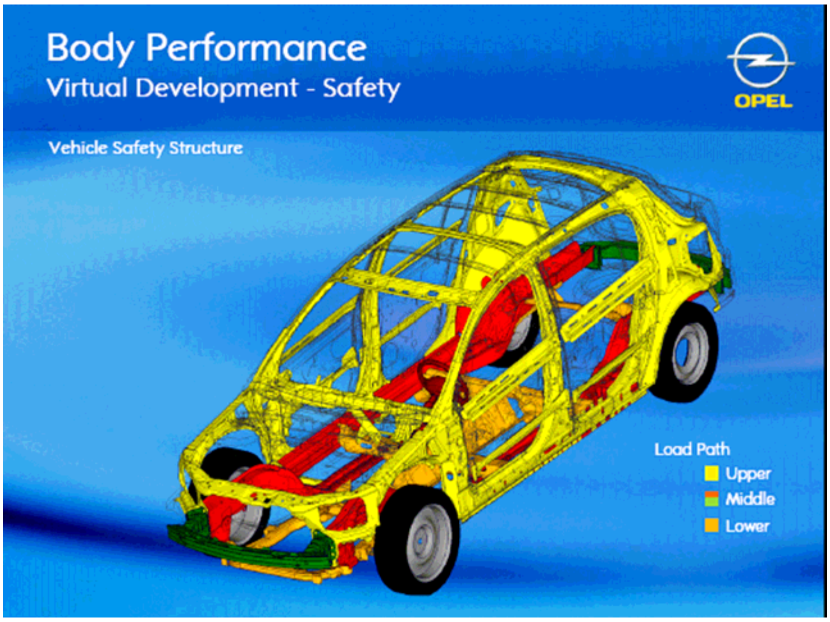
Relative deformations in the energy absorption and safety cell zones



Source: the Peugeot 307 CC body, Ph. Perrot, R. Vincenti, C. Feuvrier, "Automotive Circle International" conference, Bad Nauheim, 21-23 October 2003

Figure 3.4

The vehicle safety structure



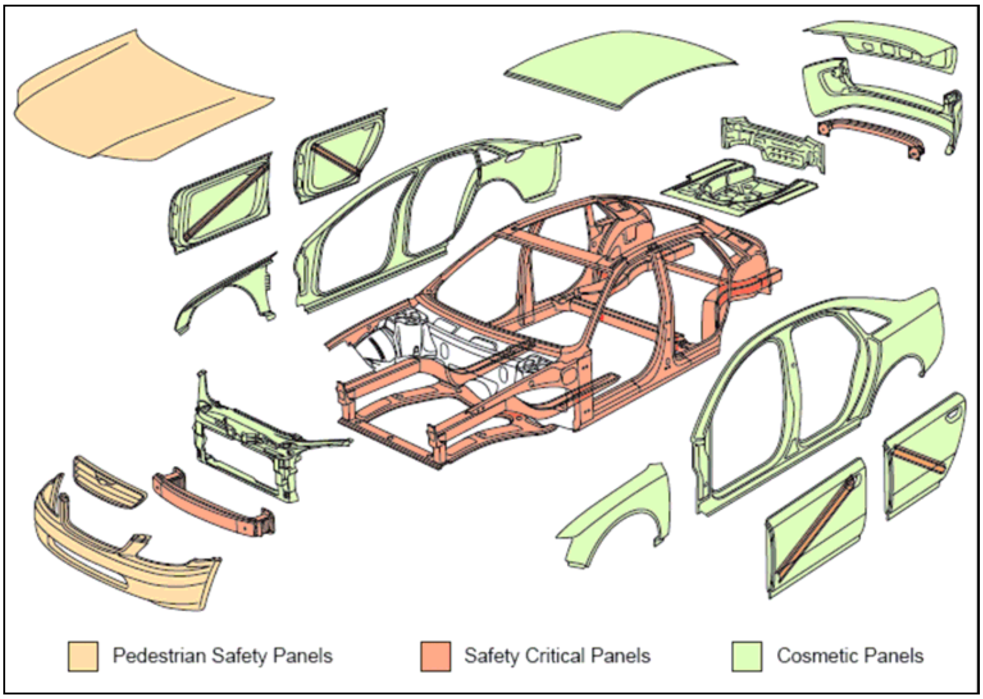
Source: the New OPEL SIGNUM body, R. Strehl, I. Butz, "Automotive Circle International" conference, Bad Nauheim, 21-23 October 2003

Vehicle safety engineers clearly do not consider outer skin and “styling” parts to be related to occupant safety. Thatcham’s Director of Operations stated:

“I did attend a vehicle safety conference in Germany in 2004. I would make a clear observation from the information presented by the various vehicle manufacturers, that being, the primary focus for effective high speed passive safety, be it front, rear, side or rollover, is the load / impact distribution, using the main frame of the vehicle to disperse and spread the energy from the crash. Indeed, all illustrations and FEA (Finite Element Analysis) normally present translucent panels and from this one would assume these are of no or negligible importance. Panels performance is more related to resistance to low speed damage,(scratches, dent resistance etc) and primarily NVH (Noise, Vibration and Harshness) as they act as speakers, amplifying any small noise or boom.”

However, as we know, some of them are directly implicated in pedestrian safety. Figure 3.5 shows which panels or parts play which role in safety. The vehicle occupant safety critical parts, which are part of the energy absorption zone and the safety cell, are shown in red. The panels which come within the scope of Design Rights are the purely cosmetic panels, shown in green, and the outer panels with both cosmetic role and a role in pedestrian safety, shown in yellow.

Figure 3.5
Structural and cosmetic parts



Source: Thatcham

The 1995 frontal impact crash test of an Opel Astra[14], conducted on behalf of Thatcham and under the supervision of the British government, demonstrated that wings and doors made no contribution to occupant protection. They were removed for the test, which showed that their absence caused no aggravation in the forces to which the dummy occupants of the vehicle were subjected. Note, however, that at that date internal door reinforcements were uncommon – they were first introduced by Volvo (SIPS – Side Impact Protection System) in the mid 1990s. The conclusion about doors would not be the same today. But this concerns the invisible inner structures of doors, not their visible, styled outer skins, which are not load-bearing.

A non-original bonnet had been fitted and this was observed to bend and not violate the integrity of the safety cell, in conformity with the relevant US NHTSA standard. Of course, that test only showed that that particular bonnet was safe, with respect to that test and standard. This does not automatically apply to all replacement bonnets. A non-conforming failure mode in these could indeed have serious safety implications. It is claimed that there has been one case of a counterfeit bonnet failing to fold in a crash in Spain, killing the car's driver[15]

The US Insurance Institute for Highway Safety is categoric: "Cosmetic Repair Parts: irrelevant to safety"[16]. This statement is based on a comparative crashworthiness evaluation of 1997 Toyota Camrys, with and without cosmetic parts (although the bonnet was left in place). There is also a reference to similar results for a 1987 Ford Escort[17]. IHS gives this definition on the front of its Status Report: "A car's cosmetic repair parts (often called crash parts) include fenders, door skins, bumper covers and the like".

The 1999/2000 ATZ assessment of non-OE body repair parts (described in Section 3.7) confirms the Thatcham and IHS findings. In his book, The Passenger Car Body[18], p. 78, Dr.-Ing. Dieter Anselm refers to an estimate made by Rauser and Grossmann[19] that 79% of the kinetic energy in a 50 km/hour front impact is dissipated by the vehicle front end structure, 12% by the powertrain and 9% by the bulkhead. The energy absorption of the vehicle front end itself is distributed 72% through the front side members, 22% through the wheel arches and 6% through the fenders.

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[14] Vauxhall Astra 1.4 GLS special impact report, FMVSS 208, 204, 212, 219, 301 (Ecar test), impact date 09.03.95. A new test is planned for September 2006. We have not found evidence of other such tests, apart from IHS's.

[15] Cited in "Impacts de la contrefaçon et de la piraterie en Europe, rapport final", Reboul, Py and Thomas, July 2004, CEIPI – in fact no source is given, and the phrase used is "a case is known in Spain in which ...". This is hearsay, not serious evidence

[16] Special issue: cosmetic repair parts, Status Report, Vol. 35, February 19, 2000

[17] This test was on a US Escort, not a European one – the two vehicles have very few parts in common

[18] The Passenger Car Body: Design, Deformation Characteristics, Accident Repair, Dieter Anselm, English Version, Vogel Verlag, 2000

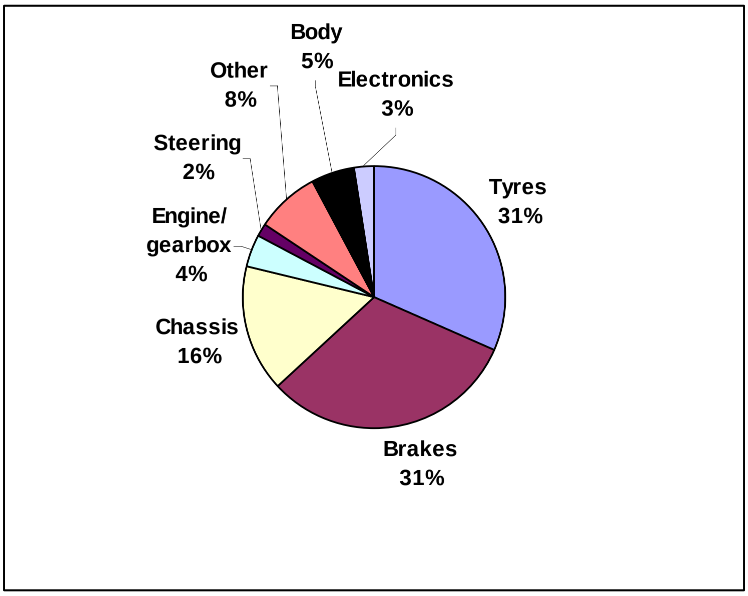
[19] Rauser, M. und Grossmann, M., Energieumsetzung von Personenkraftwagen beim Frontalauprall, ATZ 85, Heft 9, 1983, S. 553-559

A reservation must, however, be made with respect to doors. As improvements in front impact protection have been achieved, so attention has shifted to side impacts. This has led to the generalisation of reinforcements within the door frame, to protect from intrusion. These reinforcements can be used as one of the pathways for chanelling front end impact energy into the safety cell in a controlled fashion. Thus doors have in some cases gained an active role, although this concerns their internal structure, not their visible outer skins.

3.4 The evidence about safety risks

Body parts play a negligible role in the origination of accidents. Winterthur Insurance supplied us with the results of Dekra's 1996-2000 investigation of accidents. Of all crashes investigated, 64% involved vehicles free of defects, whereas 36% suffered from defects. This is consistent with overall experience that the major causes of accidents are driver error and/or road conditions. Of those defects found on investigated vehicles, only 25% were safety relevant. The statistical distribution of those defects is shown in Figure 3.6. The proportion of investigated crashes caused by bodywork defects is thus 0.054%. To be fair, this tells us nothing about how many crashes arising from other causes might have had their consequences aggravated by defective body parts.

Figure 3.6
Distribution of defects responsible for accidents in investigated vehicles, 1996-2000



Source: Winterthur/Dekra

Dekra's statement made directly to us reads:

"By order of the police authorities and public prosecutors, DEKRA investigates vehicles after accidents to clarify if technical defects or modifications might have had an effect on the accident incidence. These investigations have been analysed since 1976 and regularly

monitored and published as statistics.

The results of the last evaluation are outlined in the DEKRA Technical Paper 58/05 (printed version, in German language) which we could send to you on request. An English edition is available as a pdf.document.

This evaluation was made exclusively with passenger cars, Previous investigations included commercial vehicles, buses and motorcycles (DEKRA technical paper 55 - available only in German).

During these investigations we have occasionally detected wrong or inappropriate spare parts, mainly in braking systems, tyres or steering systems. However, inappropriate or non-admissible body components were not noticed. The prevailing part of technical accident causes was however neglected maintenance and repair of mainly older vehicles. During periodic vehicle inspections non-admissible and objectionable vehicle spare parts are detected but we do not keep statistics about this."

We asked the following questions (amongst others) of the vehicle industry, the insurance community, parts distributors, repairers, homologation and certification agencies, safety and testing institutes, and public authorities:

- What statistical evidence is there of repair difficulties and failures?
- How many? Of what kind?
- With actual or potential consequences?
- Caused by parts or by deficient repair procedures in franchised dealer or independent bodyshops?

The European vehicle industry's answer, routed to use through ACEA was the following: *"Neither ACEA nor its members can provide this type of statistical evidence. In our view, insurance companies are in a much better position to answer this question since they pay for the majority of repairs. One report produced by the insurance company Allianz a few years ago found that the fitting time for non-genuine parts was approximately 47% higher than for genuine replacement parts and that the accuracy of fit, material quality and safety were inferior for non-genuine parts as compared with genuine parts."* – see Appendix 2 for ACEA's complete response.

The argument about excessive fitting times is a commercial one and not a priori relevant to the safety issue. Repairers confirm that this is a major concern of theirs. But it has nothing inherently to do with safety. Given that it is the vehicle industry that has advanced the charge of safety problems with non-original parts, the referral back to the insurers for statistical evidence of problems is remarkable.

We put the same question to individual insurers, to the ABI (Association of British Insurers) and to the Comité Européen des Assurances. None of them was able to come up with any evidence of danger to vehicle occupants caused by the use of non-original parts. LeasePlan, the largest vehicle leasing and contract hire provider in Europe, was also unable to identify any such safety problems.

We also put the question to the UK's Vehicle and Operators Services Agency, which both tests vehicles and oversees private testing stations. We received the following reply:

"I have searched our Collision (New & Old) and the Defects Databases, which has not identified any incidents or issues with non-OE body parts".

The accident evaluation department of TRL (Transport Research Laboratory) in the UK could not identify any such data and considered that safe repair processes were much more important than parts – a subject we return to later. Reproducibility can also be a problem with original equipment parts, they said.

Neither TüV in Germany nor UTAC in France produced any evidence of problems with occupant protection. The DEKRA report on international strategies for accident prevention[20] quotes a DEKRA study in 2000 to the effect that of 15,809 accidents investigated, 783 were directly attributable to technical defects in the vehicle, 609 probably so, with defects contributing to another 618. In the detailed analyses, no case is shown of an accident caused by bodywork defects, although illegal modifications to bodywork were found after accidents and roadside safety checks.

Centro Zaragoza's response was: "To our knowledge, there is no single case in Spain or Europe where it has been asserted that a non-OE part has caused an accident nor that the injuries were more severe because of an non-OE part has been involved, so we consider that, since security point of view, this kind of parts has a good behaviour" – see Appendix 3 for Centro Zaragoza's complete response.

The ADAC published a similar statement. In part translation: "The ADAC, on the basis of both its crash tests and of comprehensive contacts with its own members and competent authorities, knows of no incidents with safety implications with respect to the use of copy parts. With body parts there are indeed now and then problems with the exactitude of their fit (for example with wings). But this does not directly induce safety problems. The owner of an older vehicle who, from experience, places less value on exact fit to within tenths of millimeters should not be deprived of this cheaper alternative."[21]

We asked a specialised body parts distributor with over 25 years of experience in the business whether he had ever had any problems. He could recall only 3 incidents:

- In 1992 on a 1986 Honda Accord, the Taiwanese will-fit replacement bonnet opened on the motorway. So an insurance expert was called. The primary latch hadn't closed properly. The secondary safety hook failed. The weld points attaching its base to the bonnet had broken. Why ? It turned out that the repairer's father, with decades in the trade, had looked at the original welds,

[20] Internationale Strategien zur Unfallvermeidung, DEKRA Fachschrift 58/05
[21] ADAC statement to the Legal Affairs Committee of the European Parliament, 21 April 2005

thought them too weak, tried to reinforce them, and thereby had weakened the skin around the welds. So nothing wrong with the replacement part but repairer error

- The first Opel Corsa had a bonnet primary closure system which was very sensitive to the angular position of one component in two planes. It furthermore had a design defect in the OE part, in that the secondary safety hook would rupture if the primary latch wasn't fastened or let go at speed. A Portuguese will-fit part didn't adequately replicate the primary latch angles, the bonnet didn't latch shut and opened, and the secondary hook, which did correctly replicate the OE part, failed. This was the most worrying case of all, a combination of an OES design error, an execution error by the IAM supplier and of error on the part of the repairer, who failed to conduct the most elementary check, that of trying to lift the bonnet to see whether it had latched shut
- A repairer replaced a Ford Fiesta bonnet but reused the original bonnet lock, which failed, instead of replacing it with a new one. A clear case of bad repair.

It should not be inferred from this that there is a particular problem with bonnets. Three incidents over a long period is hardly evidence of a major level of risk. Nevertheless, it seems odd that bonnet latches are not subject to individual type approval, whereas door latches are. The same argument could be made for pop-up systems, which raise the bonnet when a pedestrian impact is detected, in order to ensure enough clearance under the bonnet for the pedestrian's head not to impact hard objects beneath it. Distributors in the UK, France and Italy who were questioned were unable to recall any accidents caused or aggravated by the use of non-original parts. Xparts (part of Caterpillar Logistics) distributes copy body repair parts for MG Rover and Rover vehicles, following MG Rover's insolvency, and has experienced no safety problems[22].

As mentioned earlier, seat belts and airbags are both used to prevent vehicle occupants being thrown against the inside of the safety cell in the even of a frontal impact. Seat belts are often equipped with pre-tensioners, which tighten them up at the moment of impact. Occupants are increasingly being given additional protection in side impacts by the use of lateral airbags. All these devices must deploy at exactly the right moment, which relies on the detection of the impact by sensors. The issue of timely deployment of airbags and activation of seat-belt pre-tensioners was raised in some discussions. In fact outside style parts are not stiff enough to trigger the accelerometers, so they play no role in the timing of the activation of these safety devices. The accelerometers are normally rigidly attached to the front of the structural part of the body. They are set to "fire" when a high enough deceleration is registered, indicating that a serious crash has taken place. This is normally when the energy absorption zone starts to deform. Cosmetic parts are not implicated and it does not matter whether they are "good" or "bad" - unless they are so solid that they set off the airbags in a 5 mph impact. But they would have to be very rigid indeed to create the deceleration "spike" needed – this would not happen in practice. It has

[22] Had Xparts not set up a supply of copy parts, notably from Stadco, 3 million owners would have found their cars unrepairable after a crash

basically been shown by Thatcham and IIHS testing that the cosmetic panels do not contribute to crash performance - they are not 'seen' by the crash pulse – in the same way a bullet does not 'see' fabric or something very soft. The deceleration high enough to set off an airbag has to be severe – this can only be caused by a 'rigid' part of the car striking another rigid object.

The ACEA submission additionally raises the potential risk of a non-original wing being too rigid, not collapsing properly under frontal impact and therefore jamming a door. It refers to the requirements in the side impact and frontal impact Directives that a sufficient number of doors must be capable of being opened after an accident without the use of tools. We have found no anecdotal or statistical evidence of non-original wings causing a violation of this rule. The probability of all four wings having been replaced by deficient non-original parts and blocking all four doors in the case of a car impacted at both the front and rear is clearly extremely small. The accreditation process discussed in Section 4.4 will ensure that copy parts behave exactly as the original parts.

3.5 The risk potential

Figure 3.7
Thatcham definition of accident damage

TYPE	DEFINITION	SKILL	EQUIPMENT	PANEL TYPE
1. Small/Medium Area Repair Technique (SMART) Paintless Dent removal	Basic lowest level damage: Dent - paint not damaged.	Trained in SMART techniques to ease out the dent without damaging the paint, with skilled use of appropriate bespoke equipment.	Set of tools designed to ease dents, without damaging the paint. Usually from a mobile van unit	No replacement panels required
2. Small/Medium Area Repair Technique (SMART)	Bumper scuffs. Minor paint damage on one panel, suitability of this technique also dependent of position of damage e.g. not near to join or on creases.	Trained in SMART techniques to ease out the dent with skilled use of appropriate bespoke equipment. Some paint refinishing skills.	SMART tools, general tools, paint matching, application and drying. Identification, repair and refinishing of plastic components. From mobile bodyshop eg AutoRestore	No replacement panels required
3. Cosmetic Panel Repair	More severe damage to panel and paint (cracking of the paint). Larger area than 2, could be over one or two panels- door to wing	Traditional panel and paint skills, with staff demonstrating current competency levels appropriate to level of damage repair required	Light bodyshop equipment Hand tools & paint refinish tools. Spray booth Demonstration of availability and use of appropriate methods	No replacement panels
4. Cosmetic Panel Replacement - **Bolted parts**	Repair involves replacement of panel as the damage would be uneconomical to repair. Achieves better quality repair Bolted parts only: Bonnets, doors, wings, tailgates	Traditional panel and paint skills, with staff demonstrating current competency levels appropriate to level of damage repair required	Light bodyshop equipment Hand tools & paint refinish tools. Spray booth Demonstration of availability and use of appropriate methods	OE or Alternative
5. Cosmetic Panel Replacement – **Welded part**s	Repair involves replacement of panel as the damage would be uneconomical to repair. Achieves better quality repair Welded parts only: rear quarter panels, rear panels, sill panels	Traditional panel and paint skills, with staff demonstrating current competency levels appropriate to level of damage repair required including BSI accredited welders	Full bodyshop equipment including welders. Demonstration of availability and use of appropriate methods.	OE or Alternative
6. Structural Repair	Severe damage, requiring replacement of chassis, in some cases bodyshell, realignment	Traditional panel and paint skills, with staff demonstrating advanced current competency levels appropriate to level of damage repair required including BSI accredited welders	Full bodyshop equipment , including welders, jigs, measuring, realignment, steering geometry Demonstration of availability and use of appropriate methods.	OE only
7. Specialist Repairs	Repairs to vehicles using composite construction techniques eg aluminium, HSS, plastics which require adherence to specific methods	Traditional panel and paint skills, with staff demonstrating advanced current competency levels appropriate to level of damage repair required including BSI accredited welders	Full bodyshop equipment , including welders, jigs, measuring, realignment, steering geometry Demonstration of availability and use of appropriate methods.	OE only

Source: Thatcham

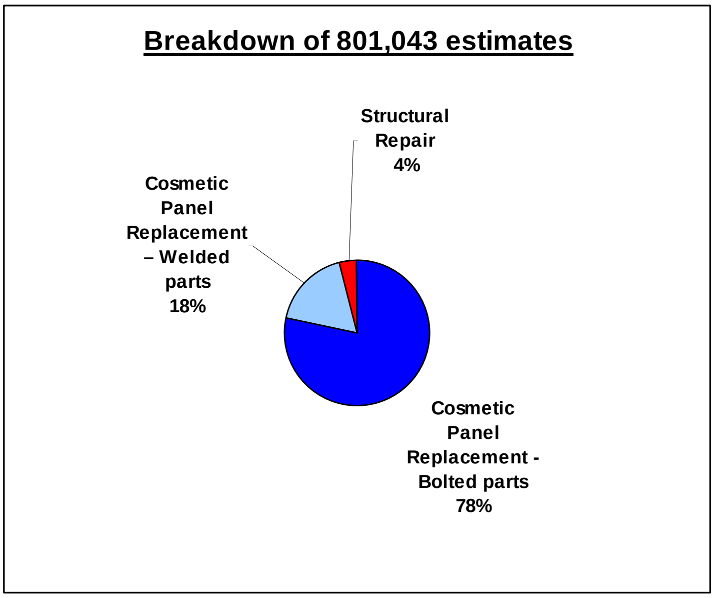
To appreciate the potential significance of the safety risks, we need to look at which parts are used for which repairs, and under what circumstances. To this end, Thatcham has created a segmentation of parts used, based on a definition of accident damage – see Figure 3.7.

There are in effect seven levels of difficulty in body repair:

1. Small/medium area repair technique (SMART) and paintless dent removal for panels
2. SMART, applied to scuffed bumpers
3. Cosmetic panel repair
4. Cosmetic panel replacement of bolted parts
5. Cosmetic panel replacement of welded parts
6. Structural repair
7. Specialist repair of non-traditional materials (HSS, aluminium, plastics)

mfbi estimates that in the UK 60% of repairs do not involve structural damage to the vehicle chassis. All repairs resulting from crashes are, of course, likely to involve repair or replacement of outside style components. An analysis provided by Audatex of over 800,000 estimates for the period January-May 2006 gives the results shown in Figure 3.8. Categories 1 to 3 in the Thatcham repair segmentation are, of course, excluded by definition, as no parts are replaced in these. Category 7 is not identified but currently probably represents 0.5-1.0% of cases – which is, of course, likely to increase in the future, presenting a real challenge to the capabilities of many body repairers. Note that this is for pressed sheet metal parts only and therefore does not include headlights, bumpers, glass and other such items.

Figure 3.8
Breakdown of replacement panels consumption



Source: Audatex

3.6 Consumption of body parts

Given these proportions, it is no wonder that the offering of non-original body parts covered by Design Rights is overwhelmingly for non-structural "cosmetic" ones, with very few structural ones listed. The economic returns in developing, making and selling the latter are simply not there, for alternative manufacturers or distributors. But of course neither do they come under the protection of Design Rights, as they are normally invisible and not part of the vehicle's exterior styling and appearance. They do, of course, have a serious involvement in safety.

ACEA's estimate of the breakdown of consumption (in their submission, Appendix 2) is not in contradiction with this:

- Outer/bolt-on panels (door, bonnet, boot lid, wings)	20%
- Outer welded-in panels (quarter panels)	10%
- Inner panels	5%
- Any esoterics (aluminium, plastic)	22%
- Lighting	8%
- Bumpers	15%
- Other glass	15%
- Airbags	<5%

The low consumption of airbags seems to indicate relatively few severe impacts. Of course, a vehicle whose airbags have detonated will very likely be a candidate for a write-off. The table below (Figure 3.9) is based on data for the frequency of parts identified for replacement in a sample of estimates, supplied by an up-line manufacturer's importer. Bolted-on parts appear three times more often than welded-on. Structural parts not at all. Once again, this is consistent with most of parts demand being for cosmetic parts.

Figure 3.9

Frequency of parts appearance in estimates

Bolted		Welded	
Front bumper	17%	Rear panel	6%
Rear bumper	14%	Right front door shell	5%
Right headlamp	13%	Left front door shell	4%
Left headlamp	13%	Lef rear wing quarter panel	4%
Bonnet	12%	Right rear wing quarter panel	3%
Right front wing	12%	Left front door moulding	12%
Left front wing	11%	Right front door moulding	11%
Grille badge	10%	Left rear door moulding	8%
Front grille	10%		
Boot badge	8%	Total	52%
Front bumper cover	8%		
Rear bumper cover	8%		
Boot lid/tailgate	6%		
Total	142%		

Source: up-line VM

Another manufacturer estimated the breakdown of their body repair parts sales as:

Outer bolt-on panels and parts	48%
Bumpers	26%
Electrical (including lights)	18%
Inner structural	5%
Outer welded	3%

Consumption of interior trim parts, such as dashboards, steering wheels, door liners or seats is negligible. Interior design is a very important part of the overall styling of a vehicle. But if these parts need replacement after an accident, the chances are that the car is so badly damaged that it will be written off.

3.7 Tests of non-OE parts

A KTI analysis of comparative crash test results with original and non-original front end parts on a VW Golf IV[23] was particularly critical of a non-original front bumper beam. This failed to absorb energy and redistribute it as efficiently as its original equivalent, thereby increasing the amount of damage done to components deeper into the energy-absorbing and protective structures, in both the 15 km/h and 56 km/h frontal impact tests. KTI concluded that worse and more expensive damage can result in a second impact, if non-original parts had been used in a previous repair. This can clearly be the case. The non-original bumper beam used clearly was of inadequate construction and might therefore not properly play its role in supporting the bumper, which in turn could mean more extensive damage to surrounding cosmetic parts. There are, however, also cases of original equipment bumper beams that provide inadequate protection to the wings by being designed too short. Bumper beams are acquiring a greater structural role through efforts to ensure Vehicle Compatibility – they are required not only to support the bumper but also to tie together the chassis front legs and improve kinetic energy dispersion in offset frontal impacts, and to be compatible in vertical positioning between different vehicles. KTI added: "Repairing passenger car bodies with non-original parts in safety-relevant areas is at present to be excluded, because of lack of quality assurance". But outer cosmetic parts falling under Design Rights are not safety-critical anyway.

A 1999/2000 investigation of the comparative quality of parts and the relative cost of body repair with original and non-original parts was conducted by AZT[24] - the full text (less exhibits) is in Appendix 4. These involved bumpers, front panels, radiator grilles, wings, bonnets and headlamps for front impacts; bumpers, rear light clusters and tailgate or boot lid for rear impact; and the driver's door for side impact. While non-original parts were significantly cheaper, AZT found a number of problems

[23] KTI: Kraftfahrzeugtechnisches Institut und Karrosseriewerkstätte GmbH & Co. KG, August 2002

[24] Dr.-Ing. D. Anselm, Dr.-Ing. Ch. Deutscher, Dr.-Ing. H. Grossmann, Allianz Zentrum für Technik (Allianz centre for engineering) – Automotive Engineering Division, Ismaning

with fit, which significantly increased labour hours and costs. Although the non-original metal pressings were found to be properly constructed and to have the correct mechanical properties, their anti-corrosion protection was inferior. One non-original bumper for a BMW 520i was made of the wrong plastic resin, which caused it to behave improperly under impact at $-30^{o}C$, which could be threatening to pedestrians. Most of the criticism has a commercial and not a safety implication.

From all this information, it is clear that, while non-original parts can cause problems for repairers and end customers, they have little role in the protection of vehicle occupants, with the possible exception of bonnets. These are required to fold correctly under frontal impact, so that they do not enter the safety cell through the windscreen aperture. This aspect does form an explicit part of whole-vehicle front impact tests. We have been told by a repairer of a case of a non-original replacement bonnet whose internal reinforcements were not properly bonded to the skin, making it insufficiently rigid. This could cause unwanted opening and perhaps incorrect folding. It is, however, dangerous to generalise from one instance.

3.8 Pedestrian safety

As was explained in the previous Section, this whole pattern of involvement changes completely where pedestrian safety is concerned. Again, we have been unable to find any statistical or case evidence suggesting that non-original parts are less safe than original ones. This may be because the Pedestrian Safety Directive is so recent. But the products in the impact zones of Figure 2.5 – bumpers, grilles, front lights, front panels, bonnets, glass – must conform with safety standards, as must the impact detection and deployment activation systems for pop-up bonnets.

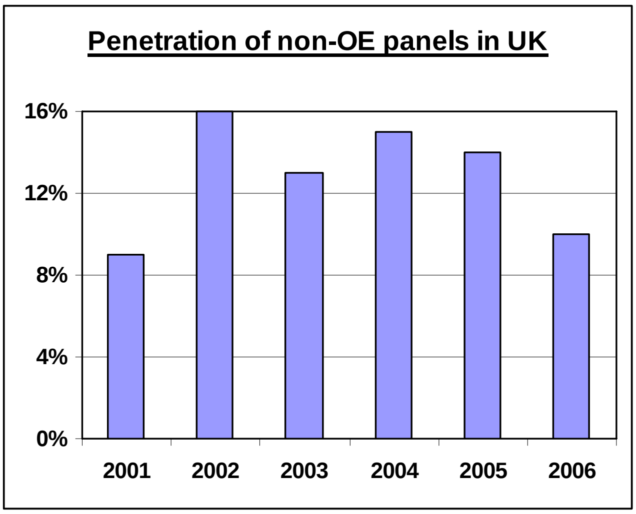
4. Adequacy of information

4.1 Market information

4.1.1 Penetration of non-original parts

It is very difficult to find any information on the actual current penetration of non-original parts in European body repair markets. Figure 4.1 gives survey-based estimates for the UK. Despite the legal ban on them in France, there is anecdotally some consumption there, principally for non-French makes of cars. The German market for non-original parts is unquantified but thought to the largest in Europe. Penetration in Spain is thought to be about 15%, although less than 1% for structural parts. Overall European penetration is thought to be about 5%[25]. Even where non-original parts are not excluded by Design Rights protection, their penetration is limited by lack of availability of complete ranges, which in turn has to do with the legal uncertainty which still exists in the EU. Body repairers will not start a repair job until they have the full set of parts they need to hand, so they are sensitive to availability.

Figure 4.1



Source: Bodyshop Magazine Refinish Industry Survey 2006

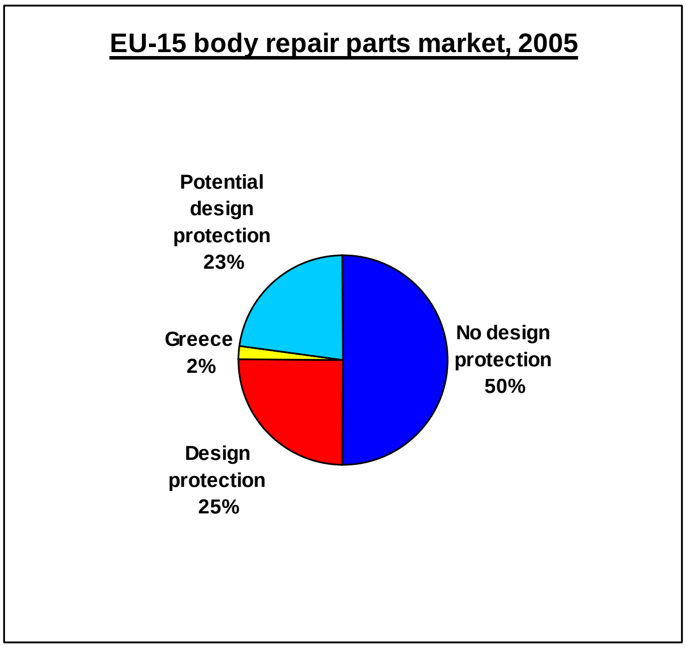
Estimates[26] for Italy split the total crash repair parts market into 70% cosmetic parts, 30% structural, with no non-original structural parts. Within cosmetic parts, front bumpers are thought to be split 50:50 but rear bumpers (almost always the subject of an insurance claim) are 90% original. Glass is 60% original, 40% copy, with windscreens available in both but side and rear glass as original only. The principal other non-original parts are wings and bonnets.

[25] The GVA (the German independent automotive parts distributors' federation) believes the 5% figure stated by ECAR to be still approximately right

[26] Given in a confidential interview by a large national spare parts distributor, with a substantial presence in body repair parts

The situation is clearly influenced by the degree of Design Rights protection that still exists in the different member states, which is summarised in Figure 4.2.

Figure 4.2
Status of Design Rights protection



Source: ECAR
Note:

- *No design protection in B, IRL, I, L, NL, E, GB*
- *Potential design protection in D*
- *Special status in Greece*
- *Design protection in A, DK, SF, F, P, S*

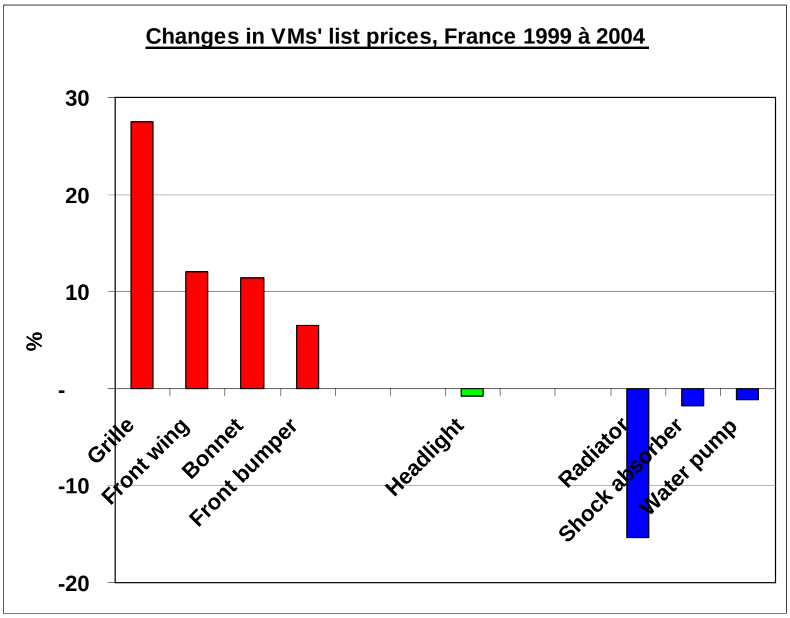
4.1.2 Prices

The Commission's Impact Assessment indicated significant differences between countries in the price of original body repair parts, up to 10% on average, largely influenced by whether they were design right protected or not. Thus it seems that competition does have an effect. Individual parts prices within a country can show much wider differences between original and non-original. Figures of 30-40% have been quoted, for example by LeasePlan. The impact of competition from non-original parts seems to be lessened by lack of availability of full ranges of these and sometimes by slowness in delivery of them, a failing guaranteed to discourage repairers, who find themselves stuck with a car in their workshop while waiting for parts. This has a direct effect on their profitability, particularly in countries where insurers oblige them to provide replacement (or courtesy) cars at their own expense.

Some of our own analysis shows how vehicle manufacturers' lists prices have moved as a function of the different degree of competitive exposure of parts – see

Figure 4.3. The more style-related the part and the more exclusive it is, the higher the VM will be able to price it. This is, of course, a perfectly normal commercial strategy, where protection and exclusivity are available.

Figure 4.3
Relative price movements as a function of competitive exposure



*Source: auto*POLIS

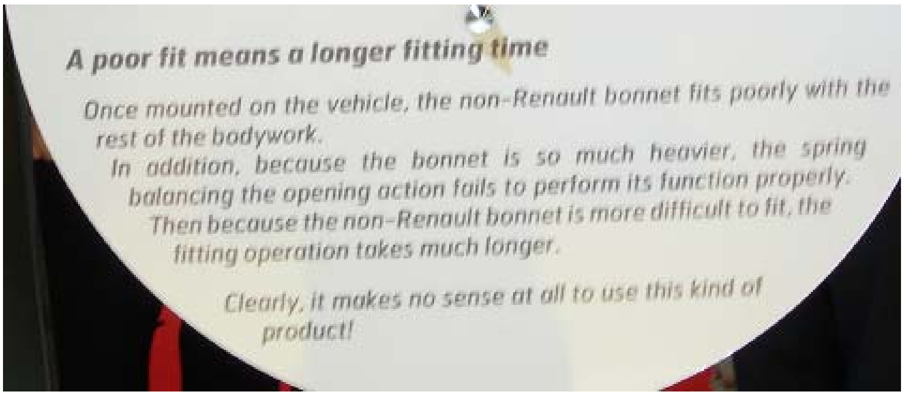
4.2 Information for consumers and repairers

Consumers are not automatically informed about whether original or non-original body parts have been used in repairing their vehicles. Nor do the great majority of them have the knowledge of the body repair process and sector required to make an informed choice. In most cases that decision is therefore delegated to the repairers and depends on their individual evaluation of the costs, benefits and risks of one or the other source of parts. Insurers may influence repairers, although this again varies greatly from one country to another, as is explained in the next section. In the UK, where insurers have considerable influence over repairers, they fall into three groups: those who have a policy of using only original parts; those who also use non-original parts and inform their policyholders of that possibility; and those who use them without telling their policyholders. In the Netherlands, there has been a conscious attempt to offer three classes of insurance: with fast repair service, a replacement vehicle and original parts; with less fast service, no replacement vehicle, and non-original parts; and minimal service with recycled parts. The last class suffers from lack of adequate supply of parts and has not yet found much favour in the marketplace.

Consumers are most unlikely to be spontaneously aware of the existence of non-original parts The only sustained communication about this comes from the vehicle manufacturers and this naturally strongly supports the use of original parts and plays on the natural inclination of the owners of at least newer cars to take the "least risk" solution of sticking to the franchised dealer source for repairs and parts.

The pitch to repairers is based on a combination of fit-and-finish and of safety. Claims made by Renault at a trade fair in 2005 are shown in Figures 4.4 and 4.5. The first of these is clearly commercial in nature: "This part may seem cheap but it's in fact a false economy to use it, as it won't look good, will be awkward in use for your customer and will be less easy for you to fit". The repairer, however, can make up his or her own mind about the trade-off between these considerations and the price.

Figure 4.4
A commercial claim



The problems come if and when a statement of the kind "Clearly, it makes no sense at all to use this kind of product !" becomes an unwarranted generalisation to all non-original parts. VW's and Audi's use of material from the KTI tests to attack non-original parts in general was successfully challenged by the GVA, the German independent parts distributors' federation, which forced these two manufacturers to sign an undertaking not to put out this kind of misleading information in the future.

There are also potential dangers in statement of the kind shown in Figure 4.5. It is a claim about safety, which the average repairer or consumer probably cannot judge objectively. European consumers are very sensitive to the crash safety performance of vehicles, as has been demonstrated by Euro NCAP's consumer research[27]. Repairers will be sensitive to the risk of claims against them. There is no demonstration that the non-original part is outside the acceptable limits of performance in this kind of impact, although it is claimed to be significantly worse. No source is cited for the impact test, although one was clearly conducted. The claim could in fact have been stronger, suggesting that the extra weight could cause failure in the hinges under impact, leading to the non-original bonnet not folding properly. It could also be claimed that the extra weight affects carbon dioxide emissions and fuel consumption, and even handling by raising the centre of mass of the vehicle.

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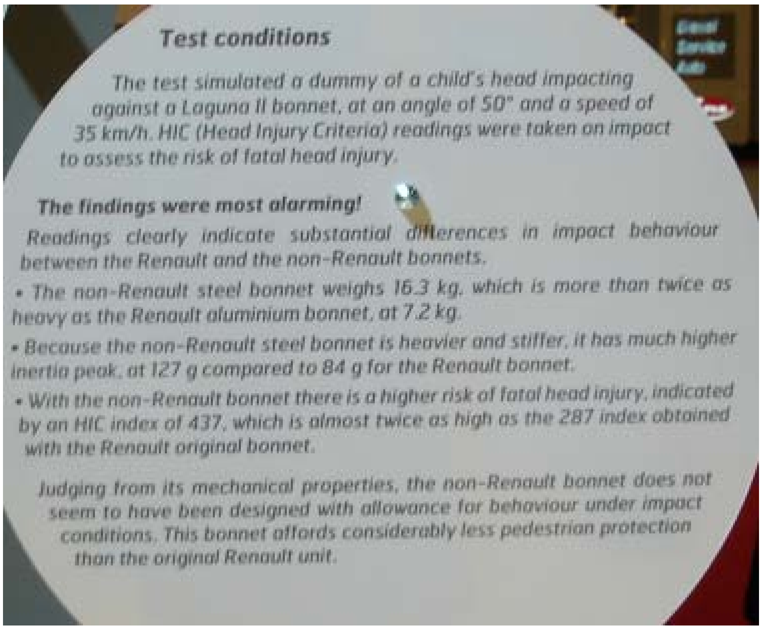
[27] 10th Anniversary Consumer Study, Research Conducted for Euro NCAP, July-September 2005, available through www.euroncap.com

Figure 4.5
A safety claim



4.3 Conformity of products

The conformity of vehicles and technical units or components, including those subject to Type Approval is closely monitored, as the following inputs testify:

"As part of the process of issuing a type approval, the Approval Authority must verify that appropriate conformity of production controls are in place. It can delegate that responsibility to its appointed Technical Services if it wishes. We are obliged to take into account valid ISO9000/TS16949 certification (not self-certification - only certification issued by an accredited certification body), if necessary with additional control plans covering issues that are relevant to the type approval if they are not covered by the ISO/TS certification. Obviously, the detail of the manufacturer's processes is confidential. Some Directives specify exactly what CoP tests the manufacturer must do (e.g. seat belts) but others do not. If not then it is up to the manufacturer to decide on what CoP testing he will do and that, again, will be confidential. We make sure that what is in place is satisfactory; we do not specify what must be in place." – national Type Approval authority

"All checking of quality of production is carried out following ISO TS 16949, coupled to the vehicle manufacturers' quality assurance processes, under the sole responsibility of the producer. Production runs are launched in conformity with the ISO 4000 standard and traceability is easy, as a sample of quality tests performed by the supplier is sent with the production deliveries to the vehicle manufacturer while the remaining tests remain at the supplier. An independent certifying agency approves the production process for a given category of parts, for 3 years renewable, consistent with the vehicle manufacturers specifications, based on a minimum score of 95A. If any significant parameter is to be changed, the vehicle manufacturer must approve this in advance." – national components suppliers' federation

"Checks are carried out following the prescriptions in Directive 2001/116 (Annexe X) or based on the 58 agreement, amendment 2 (Appendix 2) as a function of the category of parts, and/or following the specific prescriptions in individual directives and regulations by which the product has been type approved. In some cases these directives and regulations call for periodic inspections of factories, for example every 2 years and the performance by the supplier of conformity tests at defined intervals, with the results of these tests sent to the Technical Service. In addition, the Approval Authority may, if problems arise, call for an audit or the submission of product samples." – national Type Approval authority

When it comes to the aftermarket, the conformity of products system functions to some degree on trust. Original equipment suppliers are in competition, so none of them (except in very rare instances of technical monopolies) make original equipment parts for all makes and models of vehicles. Yet they are expected to cover up to 100% of applications in their all-makes ranges for the independent aftermarket. In practice, they are trusted to apply original equipment standards to all these applications. Regulation 1400.2002 has reinforced this concept, by redefining what constitutes original quality in a spare part on a technical and industrial basis, rather than by the channel through which the part is distributed (franchised dealers in their parts wholesaling role versus independent parts distributors).

It was assumed in the past that they all came from original equipment (OE) sources, although some doubts have occasionally been expressed about that. Body panels (far the largest category of body repair parts) are not subject to a specific type approval and therefore do not need to be certified for conformity in production. As long as the vehicle manufacturers were officially the only source of them, it was assumed that they were produced under the same conditions as the OE part – which they generally are, while the vehicle is in production. Note, however, that there is no publicly verifiable test that the series part is in conformity with the parts tested. Nor can there easily be, where occupant safety is concerned, given that they are supposedly only tested as part of a whole vehicle crash test. Conversely, it is feasible for pedestrian impact tests, which do not require the sacrifice of the vehicle.

This repeatability is in practice ensured by the vehicle manufacturers' own individual quality control and production conformity procedures (this is confirmed in ACEA's submission), given that individual body parts are not subject to independent type approval, except where (as for headlights) they are treated as a separate Technical Unit or Component – and then it is not for their crash properties. There do not appear to be regular independent checks on whether series replacement body parts are physically consistent with the tested samples. Conformity is controlled through self-testing under quality standards such as ISO 9001 and 9002. What is checked therefore is not the parts but the plant that produces them. This being so, there is neither more nor less reason to trust the series production conformity of non-original as opposed to original parts producers. Some suppliers (such as Talleres Oran, a major Spanish producer of non-original replacement body panels) work for both the original and the copy parts markets.

4.4 Certification of non-original parts

Institutions and procedures exist in Europe for the certification of non-original body repair parts. This involves testing for fit, finish, and conformity of construction and materials seeks to reassure the body repair sector, insurers and consumers about the quality of non-original parts. There are four basic routes available:

- CAPA in the US, far the biggest, mandatory for all parts sold to insurers there
- Centro Zaragoza (CZ)
- TüV in Germany, which fits parts and tests materials
- Thatcham

Figure 4.6
Independent accreditation agencies and procedures

Accreditation Body	Proprietary Market	Manufacturer assessment criteria	Vehicle test fit analysis	Material testing	Performance testing (bench)	Distributor requirements
MIRRC (Thatcham)	UK	Annual assessment against Thatcham TQAP - M criteria	Sample parts assessed on measured vehicle in direct comparison with an OEM service part using researched times and methods inclusive of OE tolerance where available.	Manufacturer to warrant that material properties are equal to those of the OE product.	Performance testing randomly conducted to confirm aspects such as panel torsion rates and temperature endurance	Annual assessment against Thatcham TQAP-D criteria
CENTRO ZARAGOZA	Spain	No Requirement	Sample parts assessed on vehicle in direct comparison with an OEM service part.	2-tier accreditation process with conforming material and non conforming material signified by differently coloured label.	Bonnet crumple zones and mode analysed by ad hoc pendulum impact test method	No requirement
TüV Rheinland	Europe	Own Criteria	Sample parts assessed on vehicle	Salt spray only	None	No requirement
CAPA	USA	ISO 9001 + OWN CRITERIA	Sample parts assessed on vehicle in direct comparison with and OEM service part.	Material properties such as chemical analysis yield and tensile strengths. Extremely stringent area	Weld structures and latch pulls along with several other performance related tests	No requirement
MQVP	USA	QS 9000 with MQVP	Unknown but thought not to test fit parts	Material properties such as chemical analysis yield and tensile strengths. Extremely stringent area	Weld structures and latch pulls along with several other performance related tests	ISO 9000 with MQVP

Source: Thatcham analysis

These institutions use somewhat different processes but to the same effect. Their approaches are summarised in Figure 4.6. The CZ and Thatcham approaches are documented in Appendices 5 and 6. From Appendix 6 in particular it can be seen that these procedures are very close in intent and content to those involved in Type Approval. In Europe, it has not so far been mandatory to have the part independently approved, as long as the distributor and manufacturer back it. But they must bear the commercial consequences, if the market finds their parts to be inferior in fit and finish – and if there is a safety aspect, under the General Product Safety Directive.

4.5 Traceability

A by-product of body panels and structural parts not coming under specific type approvals and being largely produced by the vehicle manufacturers themselves is that it has generally not been deemed necessary to mark them for traceability. While this has not had safety implications so far, it makes it difficult to distinguish from non-original parts from original ones or to establish the production source, should a safety problem arise. The former problem mainly affects the police in tracing stolen and disassembled vehicles but potentially also in hit-and-run accidents. It can also present a problem for customs officials in combating counterfeiting.

Non-original parts certified by the agencies listed in the previous sub-section carry non-destructible labels identifying their origin. In this respect, therefore, the non-original sector is in fact more transparent and accountable than the original parts sector.

Similar certification arrangements exist in the United States, notably through CAPA (Certified Automotive Parts Association). Details taken from the CAPA website are shown in Appendix 7.

5. The body repair sector

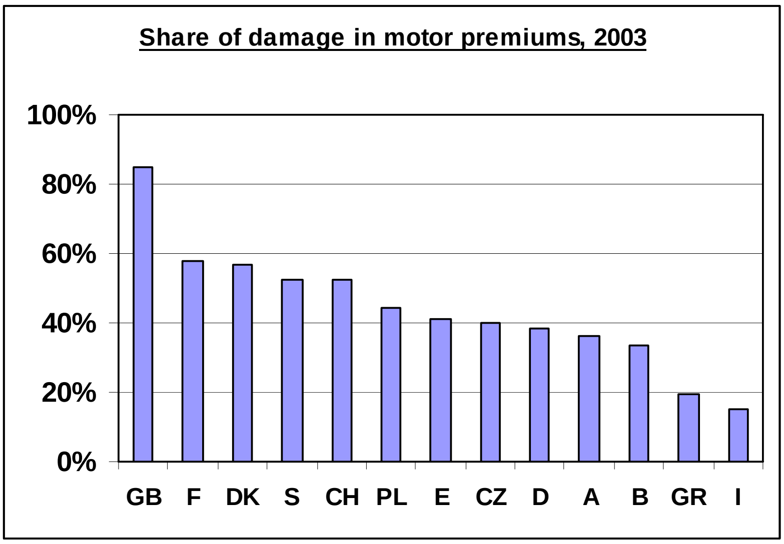
In order to appreciate the economic and financial issues at stake with respect to body repair parts, it is necessary to put them into their day-to-day context, i.e. to understand the workings of the market and industry within the body repair sector. This is a substantial and highly-specialised area of economic activity, with its own particular characteristics. It is difficult to obtain consistent and complete information about this sector across all of Europe, so we provide the best estimates we can obtain or make.

5.1 The body repair parts market

5.1.1 Consumers and insurers

The body repair market involves a complex network of relationships between different categories of owners and operators of motor vehicles, who may insure themselves against crash damage or self-insure, body repairers, insurance companies and accident managers. These relationships are by no means uniform across Europe. The most important single factor is the degree of penetration of comprehensive (or all-risks) motor insurance, versus the obligatory minimum civil responsibility (or third party) coverage, which may or may not be augmented by cover for fire and theft. The conventional accessible measure of this is shown in Figure 5.1, which shows the share of damage cover within motor insurance premiums by country, with the exception of the UK, for which we have taken the penetration of comprehensive policies. Thus there are huge differences in the kind of motor insurance cover bought across Europe. At one level, this is another quaint symbol of remaining European national differences. At another, it has major practical implications for the structure of relationships in the body repair sector.

Figure 5.1
All-risks versus liability in motor insurance



Source; CEA – the GB figure is our estimate

At the risk of over-simplification, the Italian or German model involves the majority of claims being third-party, i.e. a motorist seeking to recover the cost of damage to their vehicle from another motorist, responsible for an accident. The insurer inspects the vehicle, or has it inspected, and proposes a sum for its repair. The motorist is responsible for finding a repairer – or may just pocket the money. Thus insurers have only an indirect relationship with body repairers and do not generally pay them directly. Thus they have no influence at all on where the vehicle owner has his car repaired or on which type of spare parts he prefers to use.

In the British model, and increasingly the French one, the insurer takes control of the process from the moment the policyholder contacts them to tell them of an accident. In the UK almost universally, and increasingly in France, that call is handled by an insurer's call centre (whether their own or under contract). From that moment on, the burden is taken off the shoulders of the policyholder. They are directed towards an approved repairer, one of a network authorised by the insurer. The repairer receives or collects the car (if undriveable), often provides the policyholder with a replacement vehicle for the duration of the repair process, and returns the car, once repaired. Other than any deductible (excess), the bill goes straight to the insurer. In the fleet sector, accident managers play a similar role, notably for fleets that choose to self-insure for damage to their vehicles. Thus the primary relationship is one between insurer and repairer, with the policyholder simply bringing it into life when he or she has an accident requiring repair.

The insurer normally has a contractual obligation towards the policyholder to have the vehicle repaired to its pre-accident condition[28]. It therefore has an a priori interest in the capabilities of the repairer. But motor insurance is also an extremely competitive market, with competition mainly driven by price. Liability insurance is a legal requirement imposed on all vehicle operators and owners. Additional cover for the cost of damage to one's own vehicle has so far proved to be difficult to market as a differentiable service. Insurers therefore also have a considerable interest in containing the cost of body repair.

But the general consequence is that, while a private buyer of body repair services will obviously want to obtain them at the lowest price consistent with adequate quality of repair, insurers can exercise considerable purchasing power in certain Members States and where there is a high level of comprehensive insurance coverage, in order to reduce their cost of repairs. This is particularly evident in the UK, where there is a huge discrepancy in hourly rates between mechanical and body repair. UK motor insurers work directly with repairers and negotiate rates with them. The repairer undertakes to provide services under pre-agreed terms, notably labour rates and discounts granted to the insurer on supplies billed to him. There is no exclusivity of territory or guarantee of volume. Conversely, as the repairer is

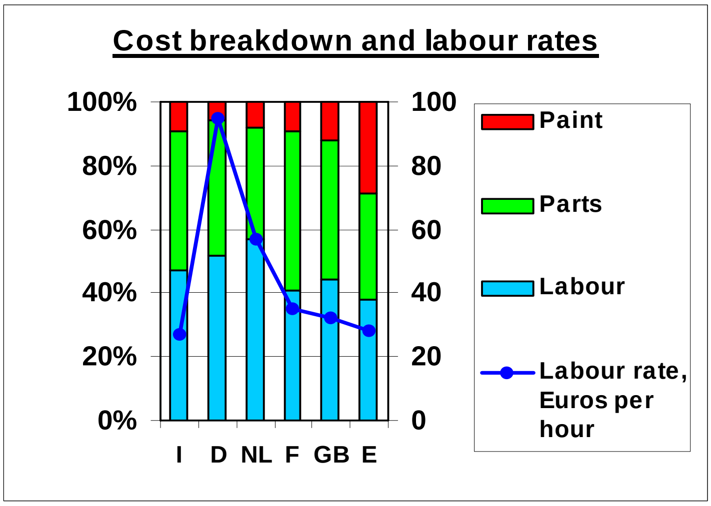
[28] Even the definition of what constitutes this condition is not the same across different Member States

normally approved by several insurers and therefore not exclusive to the repairer, the insurer cannot easily impose particular processes or standards on him.

5.1.2 Costs of body repair

Body repair after crashes is costly. Allianz calculated that repair costs made up 48.2% of all their payouts in 2003 with respect to third party liability, part comprehensive and full comprehensive motor insurance.

Figure 5.2
The cost structure of insurance-paid repairs



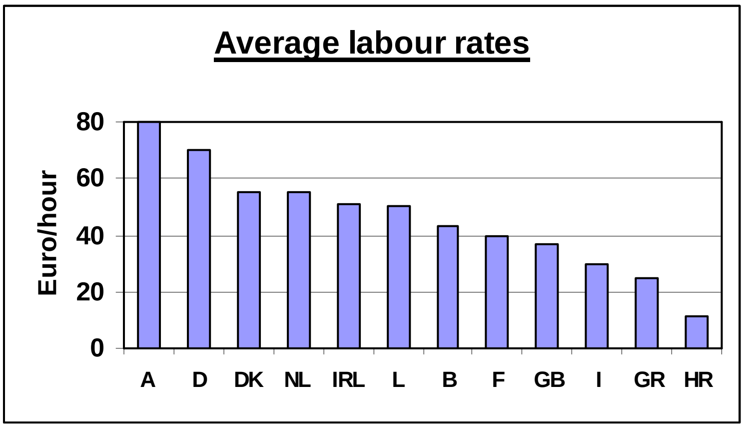
Data source: GIAC

The bars in Figure 5.2 show the breakdown of the average insurer-paid repair job in a number of countries into the three constituents that are paid for by insurers: workshop labour, parts, and paint (including painting supplies). The paint proportion is low in Germany because of the high deductibles practiced there, which discourage claims for smaller jobs, and which involve a higher proportion of painting to bodywork repair; the reverse applies to Spain. The UK has unusually high paint prices, compared to the rest of Europe.

The parts/labour mix is obviously affected by the national average labour rate, which varies considerably. The line shows the average labour charge-out rate in Euros/hour (right hand scale). This variation is further detailed in Figure 5.3. The huge differences are attributable to both the general wage level in the country and to the degree of influence exercised on repairers by motor insurers. Prices for “retail”, i.e. non-insurance, repairs will typically be somewhat above the rates set by insurers. In some countries, franchised dealers’ body repairer workshops are able to charge more than independents.

Figure 5.3

Labour charge-out rates, 2005



Source: AIRC, data for AIRC members

5.1.3 The body repair parts market

As Figure 5.2 shows, parts are an extremely important element in the body repair process and a major part of its cost – the second largest item after labour and well ahead of paint. The "commonly accepted" value for this market sector is given as Euro 12-13 billion in the EU-25[29]. We believe this estimate may be on the low side. While the UK body repair market is not representative of all of Europe, it is one of the best documented, in part because of the high penetration of comprehensive cover and the resulting high degree of contact between insurers and repairers. Survey and insurance industry data consistently shows the share of parts in the UK body repair bill at around 42-43%, suggesting a parts value of Euro 3.3 billion. With the UK vehicle parc around 1/8th of that of the EU-25, this would suggest, ceteris paribus, a European parts market of over Euro 25 billion per year.

The truth is presumably somewhere in between, at Euro 17-18 billion – a very large market indeed, representing about 1/3rd of the total European spare parts aftermarket (rather than the 25% estimate given by ECAR). Our figure also includes the non-styling parts (such as radiators, air conditioning condensors, etc) which get damaged and need replacement, whereas the ECAR figure is only for styling parts (exterior body panels, integrated front and rear lights and glass). There is also an inevitable disparity between the insurance values and the total market figures. In Germany, for example, insurers pay for the damage but the vehicle owner does not repair its vehicle at all or does not replace the damaged part but "repairs" it. Thus there is no automatic match between insurance claims payouts and the actual value of parts consumed.

Parts (and to a lesser degree paint) are important to bodyshops, and not just in technical terms. The repair customer, whether an insurer, an accident manager, a fleet or a retail (private) customer contracts for the overall repair with the bodyshop. The bodyshop provides the necessary repair labour and also procures the parts and

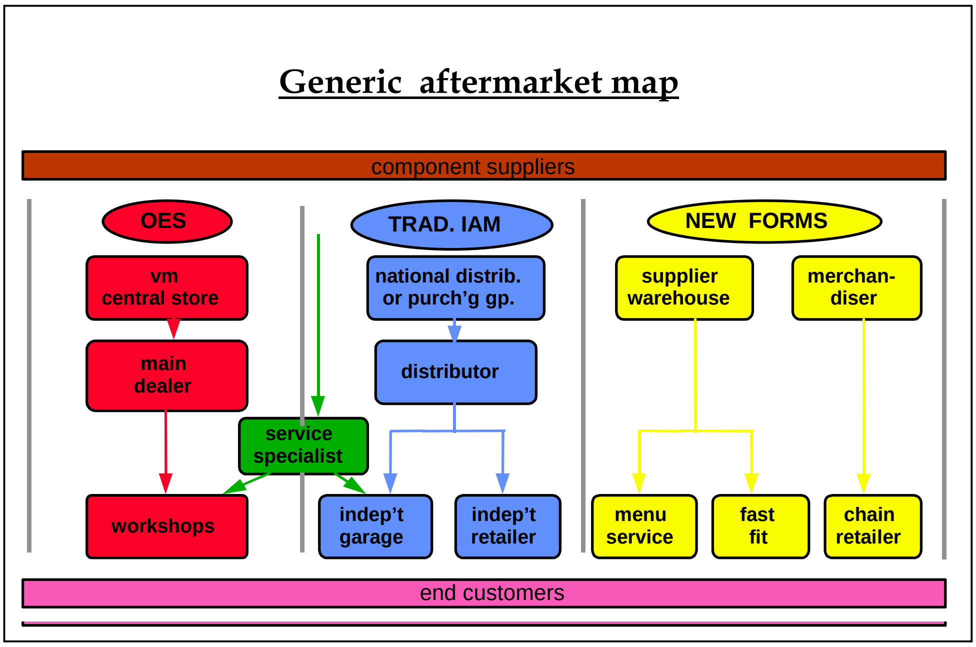
[29] EPEC-Study 12; *Commission,* Extended Impact Assessment – quoted in The Position of ECAR

paint necessary to the repair. It will normally charge these out at their list price, from which it will receive a workshop trade discount from its wholesale source of supply, as is usual in the whole garage trade. The discounts earned on parts are therefore a large proportion of the profits of any bodyshop. The size of the parts bill is of major interest to the end customer for the body repair, or for his or her representative, the insurer or accident manager, as the case may be.

5.1.4 Procurement and supply of body parts

Once the parts list for an individual repair job is generated, by whatever means, the body repair shop has to acquire the parts it needs for the individual job. This applies to any service or repair job on a vehicle. The general arrangements for the supply of spare parts in the automotive aftermarket are shown in Figure 5.4. The OES (Original Equipment Spares) or franchised dealer channels, predominantly working on vehicles of the brand of their vehicle manufacturer franchisor, are on the left in red; the traditional independent aftermarket, in which independent distributors supply parts to independent service and repair garages, both covering all makes and models of vehicles, are in the middle in red; the New Distribution channels, based on focused chained service and retail formats, on the right in yellow. The general service and repair aftermarket in Europe splits about 50:50 between the dealer and independent sectors, with significant national variations either side of this average. A major objective of Regulation 1400.2002, the Block Exemption Regulation, is to keep a level playing field for the independent aftermarket, in order to preserve the freedom of choice for end customers.

Figure 5.4
General spare parts distribution channels



*Source: auto*POLIS

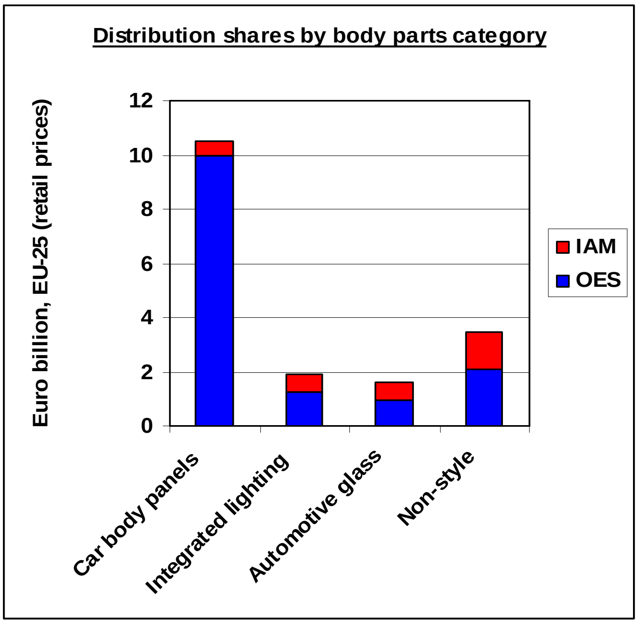
As explained earlier, the great majority of body repairers are independents, who work on all makes and models of vehicles. Franchised dealer bodyshops do not usually limit themselves to repairing only vehicles of the brand represented by the dealership. Most bodyshops are SMEs, operating at the retail service level, without the resources to create elaborate sourcing and procurement structures. They therefore have to rely on wholesale distributors for parts and paint. Their skill has historically not been particularly brand-specific. One might therefore expect them to source their parts from independent distributors. This is fact not so. By custom and practice, this role for body repair parts has been to a large extent devolved to the franchised main dealers of the vehicle manufacturers, for a number of practical reasons:

- The vehicle manufacturers have historically been the main (if not exclusive) manufacturing source of pressed steel structural and style parts, produced as Original Equipment (OE) to feed their assembly lines and replacement demand in their own press shops, or in those of closely tied contract suppliers suppliers (in contrast to this, they do not manufacture bumpers, lighting and glass or the non-style parts, such as radiators and batteries but purchase them from independent parts producers)
- Their Parts and Service departments devote large resources to assembling and distributing complete ranges of service and repair parts for the mechanical, electrical and body maintenance and repair of vehicles of their brands. They undertake to provide these for all models and variants of vehicles, for at least 10 years after the end of assembly of a given vehicle
- Their franchised Main Dealers act as the local distributors for these parts, supplying their own workshops, those of sub-dealers of the brand, the independent repair trade, and retail customers
- These wholesale outlets are convenient one-stop shops for the repairers. As a consequence, other parts required in body repair but made by independent suppliers, such as bumpers, glass, headlights and tail lights, grilles, radiators, airbags, etc, etc are also predominantly distributed through the franchised dealership channels, traditionally also known as the OES (Original Equipment Spares) channels.

ECAR has estimated the market by category of parts and through which wholesale distribution channels – OES versus IAM (Independent Aftermarket) – they flow. We have extended this to cover the non-style body repair parts as well. The results are shown in Figure 5.5. Body panels are 95% distributed through the OES channels, because of the vehicle manufacturers' historical production monopoly.
Lights predominantly go through the OES sector. Development and tooling for today's extremely complex and style-integrated headlamp units is extremely costly. They are also very difficult to produce without excessive levels of rejects. This sub-sector is dominated by three large original equipment suppliers, Valeo, Hella and Automotive Lighting, with a minor role played by Taiwanese IAM producers. It is difficult for a supplier to offer a complete all-makes range. As independent parts distributors do not act as range assemblers, they have no complete range to offer. It

is therefore easier for the repairer to purchase these parts from a local main dealer of the brand of the vehicle he is repairing. The effect is less strong in tail-light clusters but the replacement consumption value of these is much lower.

Figure 5.5
Channel shares in wholesale body repair parts distribution



Source: ECAR[30]*, autopolis estimates*

There is one significant exception to this overall tendency. A substantial proportion of replacement glass is installed by specialised fast fit chains, such as AutoGlass/ CarGlass, in cases where there is no body damage (windscreen cracked by a flying stone, or a side window broken by thieves). These chains are part of the New Distribution sector and can and do source directly from the glass manufacturers. Laminated windscreens can also be replicated by specialist IAM manufacturers, using simple cutting and bending means.

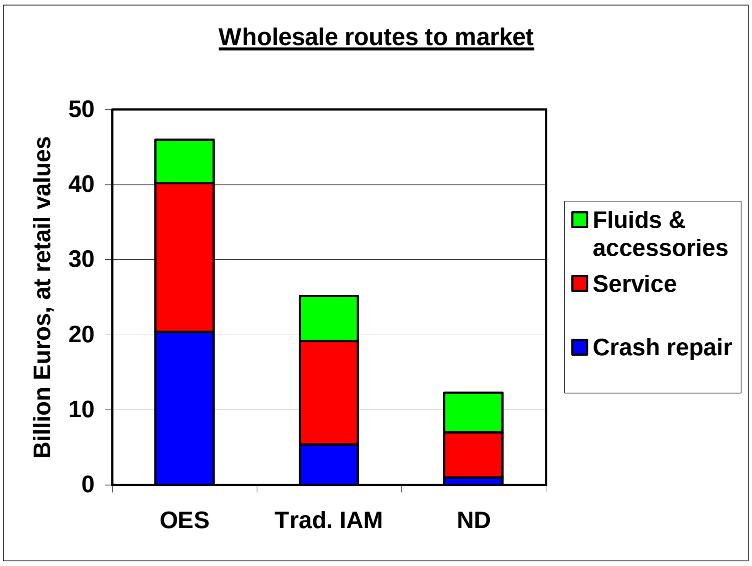
Non-style structural pressed parts are the exclusive domain of the vehicle manufacturers but mechanical parts generally come from independent suppliers. In the case of radiators, there are major aftermarket-specialised manufacturers, equipped to handle a wide diversity of references and low volumes.

The overall result is that over 80% of the value of the body repair parts market is handled through the vehicle manufacturers and the OES distribution channels that they control. The position of body repair parts within the whole parts aftermarket, in terms of parts distribution, is shown in Figure 5.6. There are three primary sectors in the European automotive aftermarket:

[30] ECAR, op.cit.

- The OES channels, consisting (as explained above) of the vehicle manufacturers' parts & service divisions feeding parts into the franchised main dealers, who act as wholesalers to supply their own workshops and those of the service sub-dealers
- The traditional IAM, consisting of the components suppliers feeding parts into the independent parts wholesalers, whose principal customers are the independent service & repair garages
- The ND or New Distribution sector, containing the auto centre and fast fit chains, and the mass merchandisers.

Figure 5.6
Aftermarket parts distribution channels



Source: McCormack and Wormald, The European Automotive Aftermarket, 2006

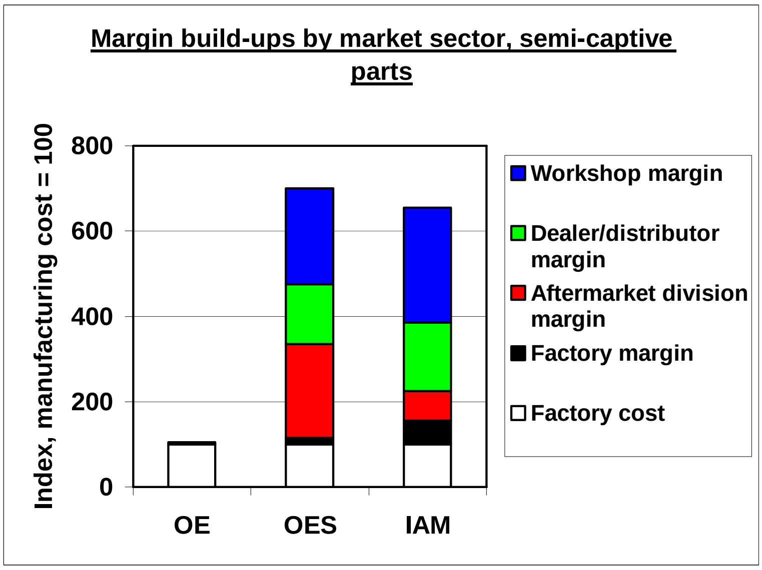
As mentioned above, in the case of mechanical and electrical service parts, the OES:IAM (traditional + ND) split is about 50:50 across Europe, although with considerable deviations in either direction by country. The shares at the wholesale level of the chain about match those at the workshop/retail outlet level. There is relatively little cross-selling between the two sides at the wholesale level – the franchised dealers are not allowed to sell original equipment spare parts to the independent distributors.

In the case of body repair parts, for the reasons explained above, the majority of the consumption takes place in bodyshops within the IAM but the overwhelming majority of wholesaling takes place within the OES sector. Thus body repair weighs almost as much in the turnover of the OES sector – and therefore of the manufacturers' parts and service divisions – as does mechanical/electrical service and repair. One manufacturer's aftermarket division confirmed to us that body repair parts constitute almost 40% of their total parts sales.

5.1.5 Margins and profits

Traditionally, parts suppliers have earned much greater margins in the aftermarket than on original equipment supplies to the manufacturers' assembly lines, and more in the independent aftermarket than in selling into the OES sector. This is illustrated for a semi-captive part (made by an independent supplier but part of vehicle styling) in Figure 5.7. Manufacturing cost is the same, as the same original equipment part is sold into all three market sector. The factory's margin is very small on OE, modest on OES and greatest on IAM sales. The aftermarket division takes its margin (in red) to cover its operating costs (procurement, range assembly, cataloguing, warehousing, outward shipping, marketing, etc – these are complex and substantial operations). Then come the margins of the wholesale distributors in the two sectors (in green) and the workshop margins (in blue). The top of the columns are the OES and IAM list prices, the IAM price usually being slightly below the OES price. The parts cost the end customer far more than when they are built into a new vehicle. But this partly reflects the considerable extra cost of making them available everywhere in Europe, in close proximity to the need of a multitude of workshops, and on very short notice.

Figure 5.7
Relative profitability of OE, OES and IAM parts businesses

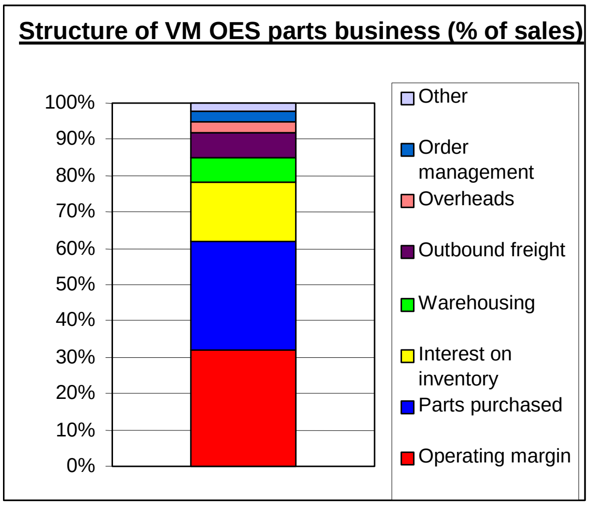


*Source: auto*POLIS*, component supplier*

However, the OES range assembler (the parts and service division of the vehicle manufacturer) takes a substantial gross margin, leaving much less to the franchised dealer in his role as wholesaler distributor. This is the same pattern observed in new car margins. This limits the dealer's ability to discount and amounts to indirect control of his outward selling price. The size of this margin and the resulting profitability of the manufacturers' spare parts businesses is estimated in Figure 5.8. Average gross margin is of the order of 60% and operating margin around 30%.

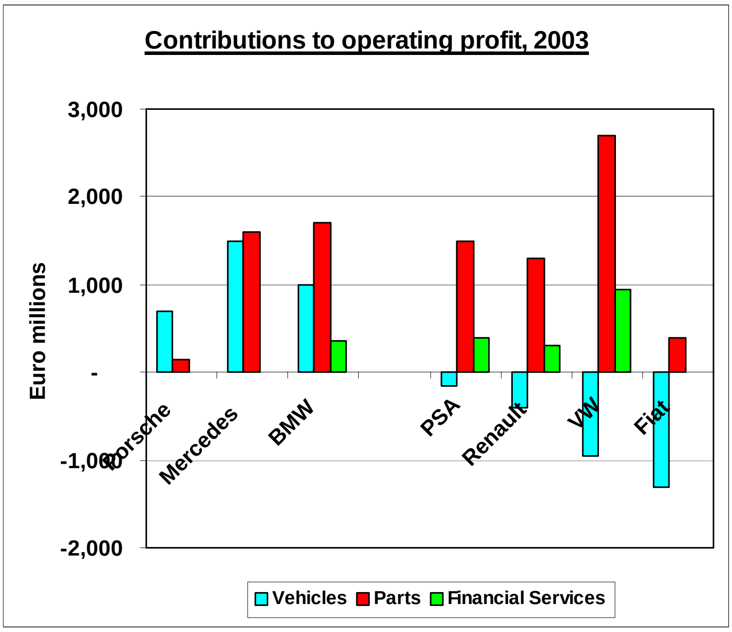
These high prices and margins mean that the sale of spare parts, mainly produced by independent suppliers, is a major source of profits for the majority of European vehicle manufacturers. The extent of this is estimated in Figure 5.9. Spare parts in aggregate contribute 6-10% to turnover but 40-45% of operating profit for a volume manufacturer under normal circumstances. This is not a law of nature but the result of the business model the manufacturers have chosen to adopt, in which they try to sustain the market for new vehicles by lowering prices for these, making up the lost margins from their disproportionate profitability on spare parts.

Figure 5.8
Estimated profitability of a vehicle manufacturer's spare parts business



*Source: auto*POLIS

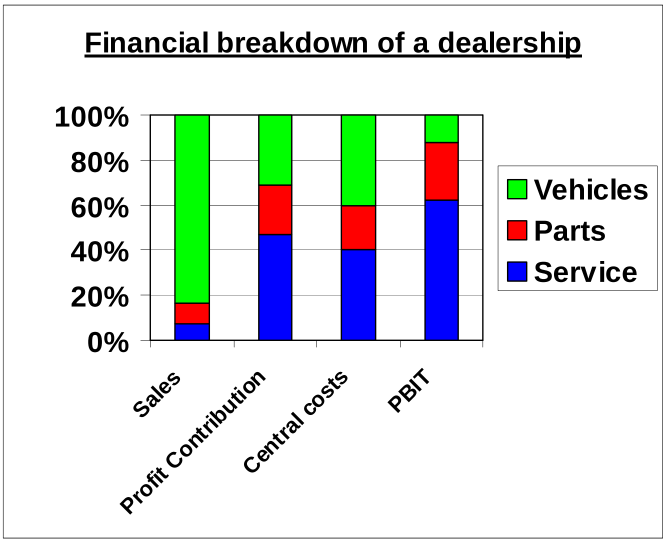
Figure 5.9
Where the profits come from



Source: Goldman Sachs

The same cross-subsidy of vehicle operations by the aftermarket applies within franchised dealerships. A real example of this is shown in Figure 5.10, taken from recent accounts of a UK dealership. In this example, the dealership makes 9% gross on new vehicle sales, taking into account the dealer margin and bonus payments, 35% on parts and over 85% on service hours. The mechanical workshop labour charge-rate is Euro 120 per hour, in contrast with the average UK insurer rate for body repair of Euro 37 per hours. Is it any wonder that this dealership does not operate a bodyshop, or that the number of dealer bodyshops in the UK is declining precipitously ? The UK case is extreme, in that dealers there have to live with an exceptionally large fleet sector in the new car market and also achieve a low retention of aftermarket work against competition from the IAM. But the fundamental market structures and the cross-subsidy exist throughout Europe.

Figure 5.10
Franchised dealer economics in the UK



Source: dealership accounts

5.1.6 Cross-subsidy models

We are in the presence here of two business models based on cross-subsidies. That of the vehicle manufacturers and their franchised dealers relies on the cross-subsidy of new vehicle operations by the OES aftermarket chain. The latter therefore finds it difficult to be price competitive against the IAM, which has no cross-subsidy to support. For their part, the insurers have tended to put downward pressure on bodyshop labour rates, where they could, and have not directly tackled the price of parts or paint, in effect delegating the procurement of these to the body repairers. It is, of course, difficult to negotiate with quasi-sole sources, in the case of parts, which is why the indirect approach of finding alternative sources of parts has come about.

The less competitively exposed the category of spare parts is, the higher the margins the manufacturers can earn on them. Gross margins range from 40% on mechanical service parts (such as brake pads or oil filters), in which there is vigorous competition from the IAM, to 80%+ on truly captive parts, such as body panels, of which the manufacturer has historically been the sole producer. Consequently, up to two-thirds of manufacturers' spare parts profits could be coming from body repair parts, i.e. 25 to 30% of the operating profit of a volume manufacturer. Thus the whole business model of European vehicle manufacturing is heavily based on the cross-subsidy of new vehicle operation by aftermarket operations[31]. This is equally true of franchised dealers.

There is nothing ipso facto wrong with this model, nor is it unique to the automotive industry, as long as it does not lead to anti-competitive behaviour. Economic theory and indeed the preamble to Regulation 1400.2002 recognise that exclusive distribution arrangements can reduce transaction costs but also that they must not be allowed to operate in an abusive manner[32]. Natural monopolies exist where a sole provider is the most economically efficient economic agent – but again, some form of regulation is required to prevent abuse. In the case of large body panels, it is highly likely that the original equipment press shops of the vehicle manufacturers have the lowest piece cost. Multiple pairs of large and very costly dies are required to shape large, complex and delicate pressings, mounted on lines of presses with automated transfer mechanisms. Furthermore, die sets must be rapidly interchangeable, as the continuous production rate of the transfer lines greatly exceeds that of the bodyshell assembly lines that consume their output, unless huge inventories of pressed parts are to be accumulated and stored. While the vehicle is in production, a proportion of parts is reserved for the replacement market. After production ceases, the dies still exist and can be used in a more flexible press shop to cover that demand. Thus there is little a priori cost justification for duplicating production of these parts.

The issue, of course, is not about manufacturing cost. Nor really about distribution cost, which is an inevitable burden of making a very wide variety of parts available in very dispersed locations on short notice. It is about prices and margins. The reality is that we are dealing with a semi-conflictual three-way relationship between the vehicle manufacturers as suppliers, repairers as users of the parts, and insurers (and potentially fleet owners and managers) as concentrators of demand, with the end customer somewhere to the side, with relatively little direct influence on a set of complex technical processes.

The owners and operators of vehicles are sensitive to the cost of body repair, which is an inevitable part of the total lifecycle cost of the vehicle. Repairers naturally wish to satisfy as much demand for repair as they can, within the constraint of remaining profitable. Insurers are keen to contain the cost of repairs, to which parts make a major contribution. Attempts by them to negotiate price reductions directly with the manufacturers seem not to have yielded any results. It is difficult to bargain with a supplier, in the absence of an alternative source of supply. The vehicle

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[31] This was a central observation in the *auto*POLIS *report to the European Commission on the sales-service link in 2002*

[32] For example, Markets and Hierarchies: Analysis and Antitrust Implications, Williamson, The Free Press, 1975

manufacturers are keen to protect their spare parts earnings. They have until now been protected to various degrees in different countries by Design Rights legislation. The proposal is now to level this protection downwards, which will open more national markets to equivalent quality non-OE parts.

5.2 The body repair industry

Body repair is a specialised craft skill, requiring specific training, experience and equipment. To conduct anything beyond the simplest repairs, special equipment is needed to cut out damaged parts, weld in new ones (particularly with the new high strength and boron steels), straighten damaged structures and repaint surfaces to acceptable standards of finish and within environmental constraints. Apart from the repair of superficial scrapes and dents, which are increasingly performed by fast special "miracle repair" techniques, each collision is different and so therefore is each repair job.

A body repairer must therefore be able to prepare accurate estimates of the work required, handle individual customers and insurers, programme their workflow and procure the necessary replacement parts in a timely fashion. This increasingly means that shops have to be provided with specialised internal functions for these roles, requiring a certain minimum size to support them, in terms of repair volumes, staff and premises. Conversely, the project-by-project nature of the work and its largely skilled manual nature means that large body repair "factories" are not cost-advantaged through large volumes. Body repair therefore remains essentially a craft-based SME business.

Repairers provide the premises, equipment and labour needed for repairs. They may also be required by insurers, as part of an approval contract, to collect and deliver vehicles, and to provide loan cars to policyholders while the repair takes place. They are usually responsible for procuring the materials necessary for each repair: spare parts, paint and workshop consumables.

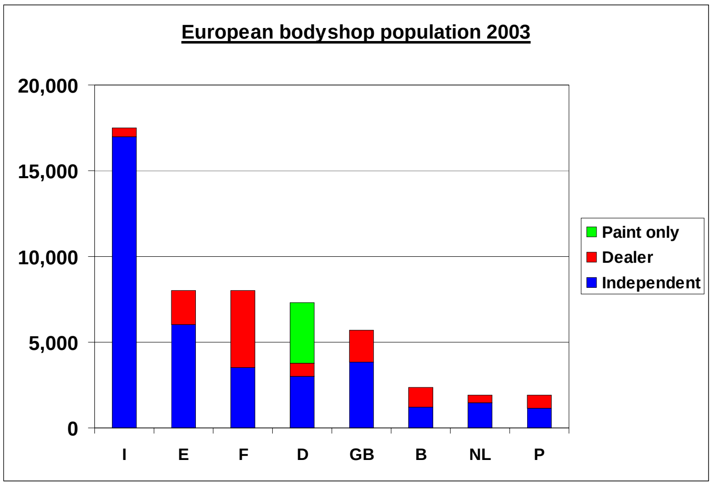
Vehicle manufacturers provide repair instructions for their vehicles and recommended repair times for individual operations. These are often incorporated into computerised estimating systems, which help a repairer, independent estimator or insurance company engineer construct an estimate of the likely cost of an individual repair, on as scientific a basis as possible. This is equivalent to imposing industrial engineering and costing disciplines (standard times, materials values and costs) to a project-based craft trade, by decomposing repairs into standard elements. The system usually also generates a list of parts required, with parts numbers.

Refinish paint systems receive approvals from vehicle manufacturers, who then seek to enforce the use of the approved vendor by bodyshops owned by their franchised dealers.

Individual repairers may or may not be members of professional trade associations, which represent them, particularly vis-à-vis the insurers. The structures and effectiveness of these trade bodies vary considerably between Member States.

Finally, government impacts the sector through general legislation and regulation of businesses and terms of employment. It also has a sector-specific impact, by controlling (or attempting to control) the safety and environmental impact of body repair activities, notably emissions of volatile organic compounds from the air-drying of solvent-based paints. There is no uniform approach to the control of the quality of repair work done by repairers, or of their qualifications and capabilities. Controlling the quality of parts used, with regard to their impact on safety, is the subject of this report.

Figure 5.11
Body repair industry structures



*Sources: AIRC, auto*POLIS

Body repair industry structures vary considerably, as shown in Figure 5.11. Italy has always had a very large number of small repairers, overwhelmingly independent – although many of them in fact work as sub-contractors for vehicle manufacturers' franchised dealers. This fragmentation is similar to that observed among independent mechanical service and repair garages in Italy, and local parts distributors who supply them. Unusually, franchised dealers control half the population of body repair shops in France, which perform some 55% of repairs. This results from a relatively concentrated structure of main dealers in France, complemented by large networks of service sub-dealers, at least for the French domestic manufacturers. These manufacturers have also systematically encouraged their main dealers to invest in body shops. Germany has large bodyshops but also the peculiarity of separate, large paintshops. The UK has a fairly concentrated bodyshop population, 2/3 of which are independents. Attempts to create disciplined chains have only been marginally successful, mainly in France and the Netherlands. In the UK, a small number of repair workshops are directly owned by motor insurers.

5.3 The quality of repairs

KTI also told us that they subjected a Passat to a B-pillar impact. It was then repaired, without benefit of technical advice from the manufacturer. The car looked fine and its dynamics and driveability were unimpaired. Then re-crashed it, in a 64 km/hour 40% offset EuroNCAP style test. The car suffered much more damage than did a previously uncrashed Passat. The safety cell didn't collapse but there was much more severe damage in the A-pillar area. There is a need to keep track of cars that have been in major accidents, via insurers and/or the police. This involves the 20% of accidents after which the car is no longer driveable. DEKRA statistics investigates the causes of a large number of serious crashes every year. The indications are that some 600,000 previously badly damaged cars are on German roads, with no-one knowing how well or badly they were repaired. People who have been in a serious car crash are emotionally impacted. Who ensures that the car is properly repaired ? A significant number of them are thought to go for repair to Eastern Europe, where bodyshop wages are much lower but also repair standards.

We calculate that with a car parc of 45 million in Germany, one would expect some 1.2-1.4 million accidents per year, of which 20% would be heavy impacts. Applying that rate back to the 600,000 potentially faulty cars would give 15,000 potentially extremely dangerous second impacts. This is obviously a serious problem – but it is primarily one of poor quality of repair, not of non-original parts, as these are generally not available for repairing the energy absorbing and safety cell areas of cars. KTI told us that almost all the non-OE parts they see are cosmetic, less than 0.1% of structural parts are non-OE.

The quality of repairs is a critical matter. AZT and Volkswagen AG subjected Golf Vs to a 56 km/hour frontal impact, repaired them according to the manufacturer's instructions, recrashed them, and demonstrated no deterioration in occupant protection.[33] With the advances in vehicle construction and the use of new materials, in order to maintain crash safety performance while reducing body weight to minimise fuel consumption, crash repair is becoming more technical and complex[34]. There is a real risk that bodyshops may not understand, for example, what they are going to need by way of welders etc. They cannot do laser welds, now increasingly used in body-in-white assembly. Increasingly, alternative fastening techniques must be used in a repair situation – this is illustrated in Figure 5.12. The manufacturers are putting out considerable amounts of information to their dealers – but the great majority of body repairers are independents, as shown earlier. A report posted on the UK's ABP website, referring to a research report, emphasizes this (the text is in Appendix 8, together with a comment from a former director of Thatcham).

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[33] Dr.-Ing. Dieter Anselm (AZT) and Dipl.Ing. Gerhard Weber (Volkswagen AG), Unfallreparaturen und Crashverhalten, Deformationsverhalten, Reparaturkosten und Auslösecharakteristik von Rückhaltesystemen nach einem Folge- oder Zweitschaden

[34] A useful guide to this is: Trends in vehicle body construction and the potential implications for the motor insurrance and repair industries, Incerti, Walker and Purton, IBIS Conference, Montreux 2005

Figure 5.12
Repair alternatives

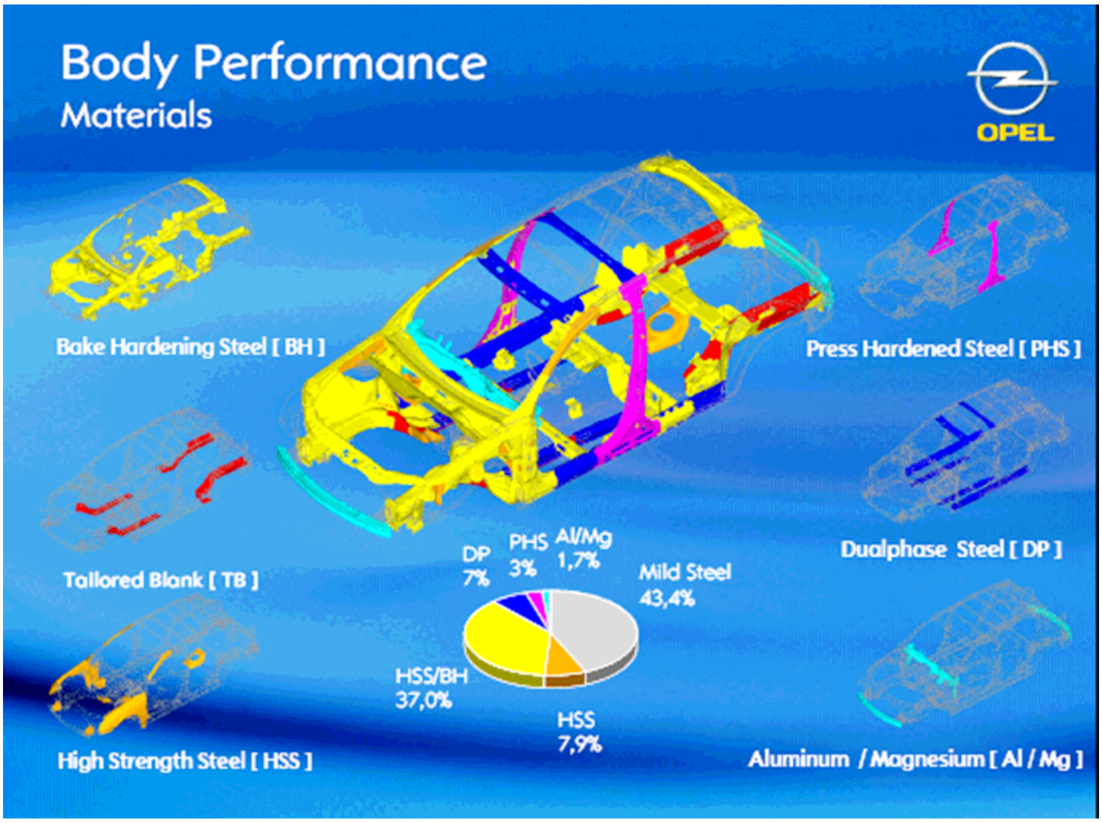
Original Joint	Repair option 1	Repair option 2	Repair option 3	Repair option 4
Spot weld	Spot weld	Mig braze through slots	Rivet and structural adhesive	
Spot weld without double sided access after construction	MAG plug weld	Break stem rivet	Rivet and structural adhesive	Mig braze through slots
Spot weld of which total joint thickness exceeds capability of service spot welding equipment	MAG plug weld	Rivet	Rivet and structural adhesive	Mig braze through slots
Spot weld with 10mm or larger weld nugget	MAG plug weld	Increase frequency of repair spots		
Spot weld in joint stack containing UHSS	Spot weld	Mig braze through slots	Rivet and structural adhesive	
Spot weld in multiple joint stack when only replacing outer panel	MAG plug weld	Use of spot welder with adaptive weld controle	Mig braze through slots	
Spot weld in multiple joint stack containing adhesive when only replacing outer panel	MAG plug weld	Rivet and structural adhesive	Mig braze through slots	
Spot weld in Aluminium	MIG plug weld			
Lazer seam weld	Structural adhesive and Break stem rivet	Structural adhesive		
Lazer stitch weld	Spot weld	Spot weld with structural adhesive		
Lazer brazed seam	Structural adhesive			
Plasma brazed joint	Panel service condition avoides joining requirement	Braze		
Self piercing rivet in aluminium panel	Self piercing rivet ajacent to original position	Break stem rivet	Mono bolt	Solid aluminium rivet
Self piercing rivet with adhesive in mixed material joint steel and aluminium	Create new joint either before or after original joint with other joining method			
Self piercing rivet without double sided access after construction	Break stem rivet	Mono bolt		
Spot clinching	Rivet			
Single pack heat curing structural adhesive	Twin pack structural adhesive			
Break stem rivet in aluminium	MIG plug weld			
Flow Drill	Hemlock rivet			
There are some OE joining processes that can be repeated but which are not used in the manufacturers repair method				
MIG brazed through slot	MAG weld			
Spot weld and structural adhesive	Spot weld			

Source: Thatcham

There is no uniform European approach to the process and quality of repair, or to the capabilities and qualifications of body shops. There may be one or multiple trade associations of body repairers in a given country; they vary considerably in their effectiveness and ability to discipline their members. Formal qualifications and training may or may not be imposed. Standards of equipment are not universally imposed. Information on repair processes comes from different sources: vehicle manufacturers, who publish them for their products; research institutes, such as AZT, Thatcham or Centro Zaragoza; official testing institutions, such as TüV, UTAC, TRL or TNO; and – last but not least – from providers of estimating systems, such as Audatex or Glassmatics. Estimating systems play an important role in making accident assessors' reports and bodyshops' estimates more systematic and transparent, by decomposing each repair job into individual tasks, with standard times, and by generating the list of parts required for it.

But the problem of the capabilities and qualifications of body repairers remains. It is getting more difficult, as the vehicle industry continues to introduce new materials (see Figure 5.13) and new assembly and fastening techniques, in order to improve both secondary safety and fuel consumption and carbon dioxide emissions, through lighter body structures.

Figure 5.13
Use of new materials in body construction



Source: the New OPEL SIGNUM body, R. Strehl, I. Butz, "Automotive Circle International" conference, Bad Nauheim, 21-23 October 2003

6. Conclusions and Recommendations

6.1 Conclusions

The study shows that existing Type Approval legislation (including the new Authorisation process) is more than adequate to ensure secondary safety performance of vehicles, independent technical units and components, whether used in the assembly of new vehicles or as spare parts. Body repair parts have not been subject to Type Approval as independent technical units or components, as they are tested and approved as part of whole vehicle crash tests and type approvals. Safety objectives, however, must be reconciled with maintaining competition in the automotive aftermarket. This requires care in the definition of parts categories (segmentation) and in the application of the Comitology procedure in particular.

Design Rights protection and safety should not be confused. There is no detectable safety problem with vehicle occupant protection caused by the use of non-original cosmetic parts. These are those parts that come under Design Rights but which are not part of the vehicle's safety structure, i.e. the energy absorption or crumple zone and the passenger safety cell. Conversely, many of them are directly implicated in the safety of pedestrians and other vulnerable road users with whom the vehicle may collide. Engine bonnets are among these parts and also have an involvement in occupant safety in a front impact, as they need to fold correctly under this. Defective bonnet latches can also cause accidents through bonnets unexpectedly opening. These cosmetic parts constitute the overwhelming majority of the volume of body repair parts consumed. Because of the costs of development and tooling, these constitute virtually all the non-original copy parts available on the market. There is no justification for subjecting body repair parts to a blanket homologation requirement. It is, however, reasonable to require the relevant parts to be subjected to a limited set of pedestrian impact tests, given that these tests are not expensive, as they do not involve sacrificing a vehicle.

The current level of penetration of non-original parts is not documented and can only be estimated. Their presence in the aftermarket does appear to have a significant competitive effect on the pricing of original parts. Communication to consumers and repairers about the available alternatives is poor and unbalanced in favour of original parts, with unreasonable generalisations and claims made about problems with non-original parts.

The manufacturing and distribution of original replacement body parts has historically functioned on the basis of trust, with Conformity of Production mainly monitored indirectly through the certification of plants. Certification agencies assess the fit, finish and materials conformity of non-original parts, together with some audits of manufacturing processes. Some safety-related aspects are covered, although they do not as yet conduct functional tests, notably for pedestrian safety. The traceability of original body repair parts is very poor, as they are mainly not given identification markings. That of non-original parts that have gone through certification agencies is much better.

Body repair is the single largest item of cost of motor claims for insurers, who pay for the majority of repairs in Europe, although the nature of their relationship with body repairers varies widely from one country to another. Spare body parts represent over 40% of the cost of body repairs and therefore a considerable market. The great majority are distributed by vehicle manufacturers and their franchised dealers. The manufacturers are thus able to earn very large margins on body repair parts, which make a large contribution to their overall operating profits. Thus freedom of distribution of body repair parts is not a *de minimis* issue at all – quite the contrary.

The body repair sector consists mainly of individual bodyshops, which are SMEs. The majority of them are independents, not linked to franchised vehicle dealers. They face a growing problem with repair skills, in the face of the increasing complexity of materials and fastening techniques used in vehicle assembly. This constitutes a far more serious potential risk to safety than the use of non-original body parts.

6.2 Recommendations

The authors recommend that within Europe a common accreditation approach be developed which includes the modest Pedestrian Safety type approval type testing required to guarantee that safety requirements are met. Consideration should also be given to the folding mode of bonnets and to the security of their latching mechanisms, together with pop-up systems, where these are employed.

Given growing concerns about the quality of repair processes, more effort should be put into integrating body repair into the safety engineering community. This should include both cooperation between the wider body repair sector (including motor insurers and their research arms) and vehicle designers to enhance the repairability of vehicles after accidents, and also making repair information effectively available to all repairers, as is required by the Block Exemption Regulation 1400.2002.

We would not seek to extend these conclusions and recommendations to sectors other than light vehicles in the automotive industry (the scope of this study), as no others, to our knowledge, involve the large-scale consumption of replacement parts that are also contribute to the distinctive appearance of the whole complex product.

Appendix 1

STATUS OF ECE REGULATIONS ('1958 Agreement') as of 30/5/06

Regulation	Series	Supp	Corr.
1 Headlamps : R_2 & HS_1	02		
2* Filament Lamps for Headlamps	03		
3 Retro-Reflectors	02	9	
4 Rear Reg Plate Lamps		10	1
5 Headlamps : Sealed-beam	02	4	
6 Direction Indicators	01	12	
7 Position & Stop Lamps	02	9	
8 Headlamps : H_1/H_2/H_3	05		
9* Noise: 3-Wheelers	06		1
10 Radio suppression	02	2	
11 Door Latches	02	1	
12 Steering Protection	03	3	
13 Brakes	10	1	
13H Brakes - Harmonized Alternative (category M_1)		3	
14 Seat Belt Anchorages	06	2	
15* Emissions	04	1	1
16 Belts & Restraints	04	17	
17 Seats & Anchorages	07	2	
18 Anti-Theft	03		
19 Fog Lamps	02	9	
20 Headlamps : Halogen (H_4)	03		
21 Interior Fittings	01	3	
22 Protective Helmets	05	1	
23 Reversing Lights		11	
24 Diesel Smoke & Power	03	2	
25 Head Restraints	04		
26 External Projections	03		
27 Warning Triangles	03	1	
28 Audible Warning Devices		3	
29* Protection of Occupants (category N)	02		
30 Tyres	02	14	
31 Headlamps : Halogen Sealed Beam	02	4	
32* Rear End Collision			2
33* Head On Collision		1	
34 Fire Risks	02	1	
35* Foot Controls			1
36* Bus Construction	03	11	
37 Filament Lamps	03	25	
38 Rear Fog Lamps		10	
39 Speedometers		5	
40* Motorcycle Emissions	01		4
41* Motorcycle Noise	03		
42* Bumpers			1
43 Safety Glazing		8	
44 Child Restraints	04		
45 Headlamp Cleaners	01	4	2
46 Rear View Mirrors	02		
47* Moped Emissions			
48 Lighting Installation	02	12	
49 Diesel Emissions	04		
50 Motorcycle Position Lamps		8	
51 Noise	02	3	1
52 Small Bus Construction	01	8	
53 Lighting Installation (motorcycle)	01	5	
54 Commercial Tyres		16	
55* Mechanical Couplings	01		1
56 Headlamps : Moped	01		
57 Headlamps : Motorcycle	02		
58 Rear Under-Run	01		
59 Replacement Silencers		2	
60 ID of Controls (Motorcycle)		2	
61* Exterior Projections (Category N)			
62 Motorcycle Anti-theft		1	1
63* Moped Noise	01		2
64 Temporary Spare Wheels		2	
65* Special Warning Lights		4	1
66 Large PCV Construction	01		
67 LPG Equipment	01	6	
68* Maximum Speed		1	
69 Rear Marking Plate (slow)	01	2	
70 Rear Marking Plate (heavy, long)	01	3	1
71 Tractor R/V Mirrors			
72 Headlamps : Motorcycle HS_1	01		
73 Lateral Protection (categories N & O)			
74 Moped lighting installation	01	3	
75 Motorcycle Tyres		11	
76* Headlamps : Moped (2 Beams)	01		
77 Parking Lamps		8	1
78 Brakes (Category L)	02	3	
79 Steering Equipment	01	3	
80 Seats & Anchorages (categories M_2 & M_3)	01	2	
81 Motorcycle mirrors		1	
82 Headlamps : Moped HS_2	01		
83 Emissions	05	5	
84* Fuel Consumption (OLD)			
85 Engine Net Power (categories M & N)		4	
86 Tractor Lighting Installation		2	
87 Daytime Running Lamps		6	1
88* Reflective tyres (category L)			1
89 Speed Limiters		1	
90 Replacement Brake Linings	01	7	
91 Side Marker Lamps		7	
92* Motorcycle Replacement Silencers		2	
93 Front Under-Run Protection			
94 Frontal Collision	01	2	
95 Lateral Collision	02	1	
96 Tractor Emissions	01	2	
97 Vehicle Alarm Systems (VAS)	01	3	
98 Headlamps : Gas Discharge (GD)		5	
99 Light Sources for GD Headlamps		2	1
100 Electric vehicles-Construction & Safety		1	
101 Fuel Consumption (NEW)		6	
102 Close-Coupling Devices			
103 Replacement Catalytic Converters		2	
104 Retro-Reflective Markings		2	
105 Vehicles for Dangerous Goods - ADR	03		
106 Tractor Tyres		3	
107 Double-Deck Buses	01		
108 Retread CAR Tyres		2	
109 Retread GV Tyres		3	
110 CNG Components		3	
111 Tank Vehicle Rollover		1	
112 Asymmetrical Headlamps		4	
113 Symmetric headlamps		3	
114 Airbags			
115 LPG & GNG Retrofit Equipment		2	
116 Unauthorised use			1
117 Tyre/road noise			1
118 Burning behaviour of materials			
119 Cornering Lamps			
120 Power of tractor engines			
121 ID of Controls			
122 Heating Systems			

Shading denotes:- Not accepted/issued by UK

The EU accession to the 1958 agreement covers all Regs EXCEPT those marked with *

GLOBAL TECHNICAL REGULATIONS ('1998 Agreement'):

GTR1 Doors, latches, etc

GTR2 Motorcycle emissions & fuel consumption

STATUS OF EC DIRECTIVES

Base Directive	Subject	Amending Directive
70/156	Type approval (Framework Directive)	78/315 78/547 80/1267 87/358 87/403 92/53 93/81 98/14 2001/116
70/157	Sound Levels	73/350 77/212 81/334 84/372 84/424 92/97 96/20 1999/101
70/220	Gaseous Emissions	74/290 77/102 78/665 83/351 88/76 88/436 89/458 91/441 93/59 94/12 96/44 96/69 98/69 98/77 1999/102 2001/1 2001/100 2002/80 2003/76
70/221	Fuels Tanks & Rear Under-Run	79/490 81/333 97/19 2000/8 2006/20
70/222	Registration Plate Space	
70/311	Steering Equipment	92/62 1999/7
70/387	Doors	98/90 2001/31
70/388	Audible Warning	
71/127	Rear View Mirrors	79/795 85/205 86/562 88/321 *Replaced by* 2003/97
71/320	Brakes	74/132 75/524 79/489 85/647 88/194 91/422 98/12 2002/78
72/245	Radio Suppression	95/54 2004/104 2005/49 2005/83 2006/28
72/306	Smoke Emissions	97/20 2005/21
74/60	Interior Fittings	78/632 2000/4
74/61	Anti Theft Devices	95/56
74/297	Safety Steering	91/662
74/408	Seat Anchorages	81/577 96/37 2005/39
74/483	External Projection	79/488
75/443	Speedometer	97/39
76/114	Statutory Plates	78/507
76/115	Seat Belt Anchorages	81/575 82/318 90/629 96/38 2005/41
76/756	Lighting Installation	80/233 82/244 83/276 84/8 89/278 91/663 97/28
76/757	Reflectors R3	97/29
76/758	Position/Stop lamps	89/516 97/30
76/759	Direction Indicators	89/277 1999/15
76/760	Rear Reg. Plate Lamps	97/31
76/761	Headlamps & Bulbs	89/517 1999/17
76/762	Front Fog Lights	1999/18
77/389	Towing Devices	96/64
77/538	Rear Fog Lights	89/518 1999/14
77/539	Reversing Lights	97/32
77/540	Parking Lamps	1999/16
77/541	Seat Belts	81/576 82/319 90/628 96/36 2000/3 2005/40
77/649	Forward Vision	81/643 88/366 90/630
78/316	ID of Controls	93/91 94/53
78/317	Defrost/Demist	
78/318	Screen Wash/Wipe	94/68
78/548	Heating	*Replaced by* 2001/56 2004/78
78/549	Wheel Guards	94/78
78/932	Head Restraints	
78/1015	Motorcycle Noise	87/56 89/235 97/24
80/780	M/Cycle Rear View Mirrors	80/1272 93/91 97/24

STATUS OF EC DIRECTIVES (Cont.)

Base Directive	Subject	Amending Directive
80/1268	Fuel Consumption	93/116 1999/100 2004/3
80/1269	Power	88/195 97/21 1999/99
3821/85	Tachograph Equipment (**EC Regulation**) 3314/90 →	2135/98 1360/2002 432/2004
87/404	Simple Pressure Vessels	93/68
88/77	Heavy Duty Diesel Emissions *to be replaced by*	91/542 96/1 1999/96 2001/27 **2005/55** 2005/78
88/599	Tachos (Drivers Hours)	2135/98
89/297	Side Under-Run (N_2&N_3)	
89/336	General (non-auto) EMC *to be replaced by*	92/31 93/68 2004/108
91/226	Spray Suppression	
91/671	Wearing of Seat Belts	
92/6	Speed Limiter Installation	2002/85
92/21	Masses & Dimensions (M_1 category)	95/48
92/22	Glazing and Installation	2001/92
92/23	Tyres and Installation	2001/43 2005/11
92/24	Speed Limiter (STU)	2004/11
92/61	Type Approval (cat. L Framework Directive)	2002/24
92/114	Exterior projections (Goods Vehicles)	
93/14	Brakes (2&3 wheels)	2006/27
93/29	ID of controls (· ·)	2000/74
93/30	Audible warning (· ·)	
93/31	Stands for 2-wheelers	2000/72
93/32	Passenger handholds (2&3 wheels)	1999/24
93/33	Anti-theft (2&3 wheels)	1999/23
93/34	Statutory markings (· ·)	1999/25 2006/27
93/92	Lighting Installation (· ·)	2000/73
93/93	Masses & Dimensions (· ·)	2004/86
93/94	Registration Plate Space (· ·)	1999/26
94/20	Mechanical Couplings	
94/55	Transport of dangerous goods (ADR)	96/86 1999/47 2000/61 2001/7 2003/28
95/1	Max speed/power/torque (2&3 wheels)	2002/41 2006/27
95/28	Burning behaviour of materials	
96/27	Lateral impacts	
96/53	Weights & Dimensions in international traffic	2002/7
96/79	Frontal impacts	1999/98
96/96	Roadworthiness testing	1999/52 2001/9 2001/11 2003/27

Base Directive	Subject	Amending Directive
97/24	M'cycle 'multi-chapter' Directive (12 subjects)	2002/51 2003/77 2005/30 2006/27
97/27	Masses & Dimensions (*cats other than L & M1*)	2003/19
97/68	Non-Road Mobile Machinery (NRMM)	2001/63 2002/88 2004/26
98/70	Reference Fuel Quality	2000/71 2003/17
98/91	Vehicles for dangerous goods (ADR)	
1999/94	Fuel consumption information & labelling	2003/73
2000/7	Motorcycle speedos	
2000/14	Noise of equipment used outdoors	2005/88
2000/40	Front Under-run Protection	
2000/53	End-of-life vehicles *(amended by **Decision** 2005/637)*	
2001/56	Heaters *(see 78/548)*	2004/78
2001/85	Buses & Coaches	
2002/51	M'cycle Emissions *(amends 97/24(Ch 5))*	2003/77 2005/30 2006/27
2003/97	Indirect Vision *(see 71/127)*	2005/27
2003/102	Pedestrian Protection	
2005/55	H-D Diesel & Gas Emissions (NEW version)	2005/78
2005/64	Recyclability	
2005/66	Frontal Protection Systems *(complemented by Decision 2006/368/EC)*	

Notes:

- 87/354/EEC amends a number of Directives only to include Greece.
- 89/491/EEC amends a number of Directives only for unleaded fuel.
- 2004/66/EC concerns the May 2004 accession of new Member States.
- Non-automotive EMC is dealt with by 89/336/EEC and its amendments.
- The 'Machinery Directive' number (non-automotive) is 98/37/EC.

Appendix 2

ACEA response to parts safety questionnaire

1. Market data

Can you supply us with a breakdown of your crash repair parts sales?

Our best estimates regarding the split between the various crash repair parts in terms of sales are as follows:

- **Outer/bolt-on panels (door, bonnet, boot lid, wings)** 20%
- **Outer welded-in panels (quarter panels)** 10%
- **Inner panels** 5%
- **Any esoterics (aluminium, plastic)** 22%
- **Lighting** 8%
- **Bumpers** 15%
- **Other glass** 15%
- **Airbag** <5%

2. Type approval

Which parts are separately type-approved, as opposed to approved as part of whole vehicle type-approval?

Separate component type-approval exists for various parts and systems such as lighting systems, mirrors, seat belts, glazing, tyres, fuel tanks, brake linings, towing hooks, catalytic converters and auxiliary heating systems. For each of these parts, there is a specific Directive that describes the requirements which these parts have to meet.

The parts and systems in question can be approved either as a "separate technical unit" (for one or more specified vehicle types) or as a "component" (for any kind of vehicle). In reality, certain parts such as mirrors and lighting devices are usually approved as components whereas other parts such as fuel tanks can only be approved as separate technical units since they simply do not fit on all vehicles.

Whether or not separate type-approval exists depends, inter alia, on the possibility of testing the parts in question separately from the vehicle itself. It is easy to understand why such separate type-approval is possible for mirrors or lighting systems. It is equally clear why despite the existence of specific Directives, separate type-approval is not possible for noise, exhaust emissions, frontal impact, side impact or pedestrian protection. The requirements of the latter Directives typically cover a variety of parts which each play a specific role and can be tested only as part of a sub-assembly or of the entire vehicle. This explains why there currently is no separate type-approval for crash repair parts with the exception of lighting devices, safety glass and rear view mirrors.

It is important to note that separate component type-approval on the basis of a specific Directive only guarantees the conformity of a part with specific technical requirements. For example, a lighting device will be checked on its conformity with the requirements regarding luminous flux intensity.

By contrast, it does not guarantee that the part, once fitted to the vehicle, will meet all additional legal requirements. For example, it will not guarantee that the lighting device complies with the requirements regarding pedestrian protection or external projections. This can only be guaranteed by the type-approval of the vehicle as a whole and the tests, including crash tests, which this is based on.

The fact that separate component type-approvals do not guarantee the complete safety performance of parts once they are fitted to the vehicle also explains why vehicle manufacturers' parts design specifications generally go beyond mere compliance with the separate type-approval requirements since they take account of the interaction of the various parts in order to ensure the overall safety performance of the vehicle.

Which are approved for occupant protection versus pedestrian/cyclist protection?

No parts are separately type-approved for occupant or pedestrian protection.

Nevertheless, it is clear from the reading of various type-approval Directives that several body parts are of crucial importance for the safety performance of vehicles (see table attached).

For example, the pedestrian protection Directive clearly lists the parts that are relevant for the pedestrian protection test. The list includes bonnets, bumpers, wings, headlights and windscreens (Directive 2003/102, Annex 1, point 2). Similarly, the side impact Directive provides states that it must be possible after the impact to open a sufficient number of doors without the use of any tools (Directive 96/27, Annex 2, point 3.3.2). This implies that doors are relevant for side impact protection for car occupants and logically wings as well since any move of the wings as a result of a crash could cause the doors to block. The frontal impact Directive contains a similar provision (Directive 96/79, Annex 2, point 3.2.5).

Are independent testing authorities used? If so, which?

Only officially approved technical services and test laboratories have the right to grant type-approvals.

The complete list is available on
http://ec.europa.eu/enterprise/automotive/pagesbackground/technical_services.htm

Other independent testing organisations also certify parts and components on the basis of quality standards for fitment, component material and corrosion resistance established by insurance companies. Since this certification is based on different requirements and procedures, it can in no way be seen as a substitute for or an equivalent to type-approval.

Are parts or whole vehicles retested when engineering changes are made, or when a restyling or facelift is done to a model?

This depends on the degree of redesign and must be decided in agreement with the technical service which granted the initial type-approval. Most Directives provide that retesting is required when the vehicle is changed significantly. For example, the pedestrian protection Directive stipulates that "any modification of the vehicle affecting the general form of the frontal structure of the vehicle which in the judgment of the authority would have a marked influence on the results of the tests shall require a repetition of the test" (Directive 2003/102, Annex II, point 3.1). From a regulatory perspective, it is clear therefore that all safeguards are in place to ensure that any vehicle continues to meet all relevant technical requirements after a restyling, facelift or engineering change.

3. Conformity of production

How is the conformity of production parts verified? Performance/quality testing? Checking of process conformity and integrity?

All production parts are subject to individual manufacturers' quality processes that are certified under all appropriate ISO standards. One part of this process is conformity of production testing at all levels (component, sub-assembly, whole vehicle), both with suppliers and with manufacturers. Details of these testing procedures are confidential and reserved for the official type-approval authorities.

4. Traceabilility

How is the traceability of individual parts ensured? Marking/codes on parts? Relationship to VIN?

Generally, parts are branded and/or carry an individual parts number. This number appears in the electronic parts catalogue and enables any user of this catalogue to determine the type of vehicle for which a particular part is suited. Various manufacturers have specific markings for those parts that are relevant for regulatory compliance and/or safety. These markings are irremovably stamped on the parts.

5. Statistics

What statistical evidence is there of repair difficulties and failures? How many? Of what kind? With actual or potential consequences? Caused by parts or by deficient repair procedures in franchised dealer/independent bodyshops?

Neither ACEA nor its members can provide this type of statistical evidence. In our view, insurance companies are in a much better position to answer this question since they pay for the majority of repairs. One report produced by the insurance company Allianz a few years ago found that the fitting time for non-genuine parts was approximately 47% higher than for genuine replacement parts and that the accuracy of fit, material quality and safety were inferior for non-genuine parts as compared with genuine parts.

Nevertheless, some manufacturers have conducted comparative tests of original and copy parts, with respect to the pedestrian protection legislation. These tests show a significantly higher risk of brain injury with copy parts that were made of a different material and had a different thickness than the original.

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Appendix 3

Centro Zaragoza response to questions

SAFETY ASPECTS

1.- Level of penetration of IAM body parts today.

The level of penetration of non-OE body "cosmetic" parts in the Spanish market is not very high. It would be roughly 15% (in European market it would be lowest, around 5%). On the other hand, the market share in Spain of non-OE body structural parts is irrelevant, because it is lowest than 1%.

We think that the reasons to justify this numbers are because the independent after market can't supply all spare parts range necessaries to repair a vehicle damaged, and the body shop needs a supplier who are able to provide all of them, and currently, the unique provider conform with this requirement is the car manufacturer.

2.- Accident caused by the use of non-OE parts

To our knowledge, there is no single case in Spain or Europe where it has been asserted that an non-OE part has caused an accident nor that the injuries were more severe because of an non-OE part has been involved, so we consider that, since security point of view, this kind of parts has a good behaviour.

In this sense, we would like to emphasise that they are two studies conducted by Thatcham in England and by Insurance Institute for Highway Safety in EEUU in which is confirmed that exterior body parts are not involved in car security.

3.- Rules to control this these risks

In relation with legislation in Spain –and in Europe- to control these risks, we want to indicate that, taking in to account that we couldn't analyze deeply this matter because of the time, in this respect there aren't specific Spanish legislation. The Spanish legislation comes from transposition of European Directives relating to vehicles and parts security.

We would like to highlight, referring to exterior parts, that with the exceptions of illumination and glasses, and the Regulations Nº42 about bumpers (external protection devices), and Nº46 about rear view mirror, or the Directive CE 70/378 about doors, the demanded requirements, since security point of view, are included in the Directive 70/156/CEE relative to type-approval of motor vehicles, and its affect to the vehicle as a whole, but there aren't specific regulations nor directives concerning to homologation of exterior body parts as spare parts.

So we understand, that it would be necessary to analyze individually the contribution of each part in the car security, and to define clearly the requirements to be comply for parts which behaviour have influence in security, and the rules and procedures to follow to verify their conformity.

4.- Apparent gaps and how best to fill them

In our opinion, the Regulation 98/71/EC protect the external appearance of the parts but does not the part itself, so this regulation don't protect the quality or security offered by the parts. Therefore, others rules must or should be that protect these concepts.

Nowadays is the Directive 70/156/CEE and the rest of regulations and directives relation with that guarantee the vehicles security, but it can there be gaps in relation with some spare parts which could have influence in the car security, which couldn't been homologated because the regulations has not been defined.

On the other hand, the Regulation CE 1400/2002 define the spare parts as "original part" and "matching quality part", and the single requirement to by comply is to be self certified by the manufacturers involved in the process.

In this environment, we think that 3ª part certification systems, as the CENTRO ZARAGOZA's system, are very important to clarify the market, because of the requirements requested in the procedures allow analyze the part from quality and security point of view, providing information to consumer about the origin and behaviour of the certified part, as well as, ensuring their traceability.

Appendix 4

Car Accident Damage Repair with Non-Original Parts

Dr.-Ing. D. Anselm, Dr.-Ing. Ch. Deutscher, Dr.-Ing. H. Grossmann Allianz Zentrum für Technik (Allianz centre for engineering) – Automotive Engineering Division, Ismaning

1. Introduction

In 1998, the Allianz Zentrum für Technik (AZT) published a study on car repair carried out with used parts. Published for the first time at the 37th "Deutsche Verkehrsgerichtstag" (German Traffic Council Meeting), a lively discussion between the car recyclers and the car industry, the "Reparaturverbände" (motor vehicle repair associations), the consumerassociations and the insurance industry on the introduction of this technically faultless and economically worthwhile repair method for accident damage developed from this. The way has now been paved, and the insurance industry has started implementation on a "step-by -step basis. On the basis of these pleasing events, the time was right for a study on repairs with nonoriginal parts be carried out in the AZT.

In 1999/2000, the AZT examined the extent to which non-original parts were technically feasible in accident repair. In a second stage, the AZT considered whether this approach would yield cost savings for the insurance industry. This paper presents the results and provides a résumé from the point of view of an insurer.

2. Background

Original replacement parts with the company logo of the car manufacturer are distributed via the respective car manufacturer's dealer and workshop network. A large number of original parts without this logo are offered in parallel on the open market. These parts come from the same production and are described as "identical parts". These are usually parts from suppliers such as headlights, radiators or windscreens. Also offered are replacement parts that have been produced by independent part manufacturers on the basis of the original part but without being tied to the test criteria of the car manufacturer. These parts are the actual non-original parts.

2.1. Scope of the study

Within the bounds of this study, information on products offered, prices, availability, supply quality, accuracy of fit and material quality of non-original parts was gathered and analysed. Like the study on used parts, the study on non-original parts was carried out on the basis of the repair of the following standard damage types on three cars representative of theGerman market:

Front damage left: bumper, front panel, radiator grill, wing, bonnet, headlight;
Rear damage left: bumper, rear light unit, tailgate/boot;

Side damage left: driver door.

In addition, the materials used for the non-original parts and original replacement parts were compared by means of laboratory tests.

2.2. Choice of vehicles

In the interests of providing a representative statement based on the study, the following choice of cars was made:

• VW Golf III, 4-door, 97 model, as a vehicle with a high market share (VW)
• Nissan Primera 2.0 SLX, 4-door, 95 model, as a representative import vehicle (Nissan)
• BMW 520i touring, model E 34, first registered 11/92, as a higher quality car (BMW)

3. Acquisition of the parts

For the types of damage described, vehicle-specific parts lists were drawn up on the basis of information from the car manufacturers or importers. A conspicuous feature were the differing descriptions for identical vehicle parts from car manufacturer to car manufacturer. Using these parts lists, a fax inquiry in respect of delivery times, terms and conditions of delivery, price and parts manufacturer or supplier was carried out. From the quotes returned, it was possible to derive a local orientation in the distribution of non-original parts. With the exception of one dealer, quotes were submitted by companies or cooperation partners only from the region of Munich. Of the dealers asked in the region of Munich, only one dealer did not submit a quote. As a result, it was not possible to arrive at a national comparison. The evaluation was made more difficult by the fact that every supplier or manufacturer of non-original parts uses his own system of part description and numbering.

On evaluating the quotes received, an average 73% of the required parts for the front damage and 33% of the required parts for the rear damage were manufactured as non-original parts. For the side damage, no parts (driver door) were offered as non-original parts (Diagram 1). On average, the price for non-original parts was 62% of the price for original replacement parts (Diagram 2). The ordering of the parts was carried out, as also the request for quotes, on the basis of the part descriptions and numbering of the car manufacturers. The choice was made inaccordance with the following aspects:
• inclusion of all suppliers/manufacturers
• complete damage repair from one supplier (dependent on the parts offered)
• complete assemblies such as bumper or radiator grill from only one supplier
• price

The delivery or availability times of non-original parts and original replacement parts showed no obvious differences. All non-original parts and original replacement parts purchased within the bounds of the study were subjected to an incoming inspection. Where there were parts that were damaged when delivered, the damage was classified into light, medium and heavy damage as defined below:

• **light damage**: could be remedied at the time of fitting with no significant additional outlay;
• **medium damage**: requires additional outlay in car body work and painting
• **heavy damage**: part profile changed.

The total number of cases of damage was around three times as great with the non-original parts than with the original replacement parts. The study ignored any repair time for partsthat were damaged on delivery for the reason that damaged parts can normally be exchanged for undamaged ones. Where non-original parts are used, however, the time workshops would have to spend on exchanging damaged parts would cause more interruptions to the work process.

4. Availability and usability of non-original parts

Of 143 non-original parts ordered (multiple orders), none of the sources were able to deliver the following 3 items, even though we were given quotes for them:

- 1 tailgate, VW
- 1 rear light, Nissan
- 1 front grill kit, Nissan.

On closer consideration, incorrect deliveries can be divided into two groups:

1. Delivery of incorrect parts due to mix-ups. This was remedied by delivery of the correct part afterwards.
2. Delivery of parts that were not available in the required version. This type of incorrect delivery only occurred with non-original parts due to the fact that not all part versions were available (Diagram 3). Specifically, this applied to the bumper mouldings of the VW and Nissan vehicles as well as the radiator grill of the Nissan. Inquiries with the parts dealers and in some cases directly with the parts suppliers produced the result that these non-original parts are generally only available in the most frequently requested (basic) version.

In the case of the VW, for example, only bumper mouldings with a surrounding bead at the top could be delivered. For the actual vehicle used for the purposes of this study, however, bumpers without this bead were needed. In the case of the Nissan, only non-original parts for the basic model, which was produced for around 4 years, but not for the 95 model produced for the following 2 years (bumpers front and rear as well as front grill changed) could be supplied. Consequently, the use of the bumper (at the rear, reinforcement was changed too) and front grill parts offered as nonoriginal parts would have re-created the appearance of the older predecessor model. On both cars, the use of the bumper mouldings offered would have resulted in a change in external appearance of either the front of the car or the rear of the car.

Changing both bumpers on a vehicle only damaged at either the front or rear would have resulted in greater cost than the use of **one** original replacement part.

After this, the part costs for each damage type and vehicle were calculated from the quotes received, although non-original parts that could not be supplied or were not available in the correct design were substituted by new original parts. The study did not examine whether, within an assembly (e.g. bumper, radiator grill), fitting dimensions and joining elements of the individual parts would allow the non-original parts of different producers to be combined. On account of this, only non-original parts were considered for whole assemblies if all the individual parts were available from the same supplier or if the quotes already assumed a mixture of non-original and original replacement parts. Where non-original parts were available in the required design, the cost of parts for the front damage on average amounted to 74% of the cost for the exclusive use of original replacement parts and 98% for the rear damage (Diagram 4).

<u>5. Repair tests using non-original parts</u>

The aim of the repair tests was to establish the extent of differences through the use of nonoriginal parts instead of the exclusive use of original parts in respect of any finishing or adaptation work required and the accuracy of fit of the fitted parts.

5.1. Procedure

The repair of the front and rear damage types described at the beginning was carried out on all three vehicles. To limit the overall outlay, no welded parts were included in the repair. Painting work was omitted since no or only slight differences arise between non-original parts and original replacement parts. Examination of the paint coat of original and non-original parts was carried out in the Institute of Industrial Technology of the AZT (see Section 6). The time spent on car body work, dismantling, finishing and fitting of parts was recorded by time-and-motion studies in accordance with REFA guidelines. In addition, any finishing work required was documented in the fitting reports.

5.2. Definition of the repair tests

On all vehicles, the repair of the front damage was essentially carried out with original replacement parts. In the case of the rear damage, it was not possible to include replacement of the tailgate or boot lid in the scope of the repair work since no non-original parts were available for these. When defining the repair tests with non-original parts, it was necessary to take account of a few specific considerations in the case of the Nissan and BMW vehicles:

Nissan

Despite purchasing the non-original parts from various dealers and firms, it turned out that all metal panels and plastic parts were supplied by the same manufacturer. Consequently, for all non-original parts it was only necessary to carry out one fitting test for the front damage and one fitting test for the rear damage.

BMW

On examination of the parts, it emerged that
• all rear lights supplied were "identical parts" (see Section 2) and
• for the rear damage, all parts supplied – with the exception of the bumper mounting – were original parts with the logo of the car manufacturer.

Fitting tests for the rear damage were therefore unnecessary.

Taking account of these background conditions, the following fitting tests using non-original parts were carried out in addition to the tests with the original parts:

• **VW** 4 tests for front and 3 for rear damage
• **Nissan** 1 test for front and 1 for rear damage
• **BMW** 4 tests for front damage

The bumper mouldings for the vehicles VW and Nissan, and in addition the front grill for the vehicle Nissan could not be supplied in the required design (see Section 4). To be able to make statements on accuracy of fit and time spent on fitting, however, the parts supplied in the wrong design were included in the fitting tests.

5.3. Results

5.3.1. Fitting time

All time-and-motion studies were carried out in accordance with REFA guidelines. The part-independenttimes for dismantling as well as fitting/mechanical work were recorded only once and used for all other cases of front and rear damage for the vehicle in question. The fitting time for the parts considered in the study was separately measured for each fitting test and includes an partly required finishing or adaptation of parts required. The fitting times for original replacement parts and standard vehicle parts were recorded separately. For comparison with the non-original parts, an average of the two was used. Since this involved the first and last fitting test in each case, a certain allowance was made for the familiarisation and learning effect resulting from repetition of the same work. The comparison made on this basis shows an increase in fitting time of 47% through the use of non-original parts averaged over all three vehicles (Diagram 5). The smallest increase in fitting time of 5% occurred with the front damage of the BMW, the largest increase of 76% with the front damage of the Nissan.

5.3.2. Accuracy of fit

For the assessment of accuracy of fit, evaluation sheets for the front and rear damage were drawn up and, on the basis of this, a subjective assessment of the gaps, overhangs and vertical alignment of the parts fitted to the vehicle in unpainted state was carried out. In addition, the sizes of gaps and overhangs were measured at specific points. In summary, the following was established for all three vehicles:
The accuracy of fit was always rated lower in the fitting tests with non-original parts than in the fitting tests with original replacement parts or standard vehicle parts.
The reasons for the low accuracy of fit of non-original parts were:

- dimensional variances
- uneven edge form
- low quality of pressing (in the case of metal panels).

In the case of the bumper mouldings, the understepping of the vertical measurement up to the bumper reinforcement (in some places as much as 25 mm) resulted on the one hand in greater difficulty with fitting and on the other in waviness in the form of the edges. In the case of the wings and bonnets, deviations in lengths resulted in uneven junctions in the region of the wing point or at the upper door junction. In some cases, deviations in shape and in vertical alignment at the junctions between door and wing as well as between wing and bonnet could not be compensated by the available means of adjustment.

6. Material tests

The aim of this test was to carry out a comparison of the materials used for non-original parts and original replacement parts. The material tests took place in the works laboratory of the Institute of Industrial Technology of the AZT.

6.1. Metal panels

In addition to a material analysis and metallography test, mechanical-technological tests were carried out on the wings and bonnets of the VW vehicle. In material composition and strength characteristics, the non-original parts show no significant differences to the original replacement parts. Greater differences existed in the surface protection. While the original replacement parts were galvanised (wing on one side, bonnet on both sides), of the non-original parts only one wing and one bonnet showed galvanising on one side only in each case. In the case of one non-original wing, a bubble-like separation of the primer coat from the steel surface was noticed.

6.2. Plastic parts

The test covered:

- a material analysis (infrared spectroscopy) as well as
- mechanical-technological tests on the front bumpers.

In the material analysis, tests were carried out to establish whether the material actually used agreed with the material designation on the part. In the case of one non-original bumper for the BMW, the deviations of the IR spectra indicated a different material.

The mechanical-technological tests were carried out at different temperatures:

- at room temperature (+20°C)
- at +85°C to simulate intensive sunshine
- at -30°C to assess fracture behaviour at low temperatures.

In contrast to the original replacement parts, the materials of almost all non-original parts showed distinct brittleness at low temperature. The use of materials of this kind must therefore be rejected on safety grounds since this presents an increased danger for pedestrians.

7. Non-original parts and repair costs

Within the bounds of this study, the consideration of repair costs included the costs of replacement parts and fitting. As already described, the paint coat was not taken into account in this study (Section 5.1). The price for non-original parts was on average 38% less than the prices for original replacement parts (Section 3). Taking account of the availability of non-original parts in the required design for the three tested vehicles, the replacement part costs were, on average, 26% lower for the front damage and 2% lower for the rear damage than for the exclusive use of original replacement parts. Where non-original parts were used, the required fitting time was, on average, 47% greater than for the exclusive use of original parts.
In the case of the VW and Nissan vehicles, the fitting tests included the non-original parts that were not available in the required design (see Section 5.2). In the consideration of the repair costs of the front damage, an adjustment of the fitting time was made for these vehicles for the normally necessary use of original replacement parts. In the case of the rear damage, the use of non-original parts for the VW and Nissan was limited to the rear lights, which were offered in the same quality as the original parts. For the consideration of repair costs, the fitting times of Audatex were used as basis for the rear damage on all three vehicles.
In the case of the front damage, the use of non-original parts for the three vehicles under consideration resulted in an average reduction in repair costs of 13 % and in the case of the rear damage in a reduction of 2 % (Diagrams 6 to 9).
In the case of the side damage, no reduction could be established since no non-original partswere available.

To calculate the repair costs of all-round damage – consisting of front, side and rear damage – a weighting was applied (front 54 %; side 16 %; rear 30 %). This weighting corresponds to the fully-comprehensive type classification for new car models. With this weighting, the reduction in repair costs including painting costs determined according to the AZT-Schwacke system is 5.4% (Diagram 10). The study on vehicle repair with non-original parts ("Fahrzeugreparatur mit Nachbauteilen") was carried out on vehicles with a high market share. For extrapolation to all vehicles, an amount must therefore be deducted from the reported reduction in repair costs. Working on the basis of extrapolations of similar studies, the deduction was established to be one third. Extrapolated to all vehicles, this study showed a reduction in repair costs of 3.6% for the use of non-original parts for all-round damage (Diagram 11).

8. Summary

The non-original part study of the AZT allows the following conclusions to be drawn:

• In respect of car body parts, only frequently required parts in the designs most in demand are generally offered as non-original parts.
• Non-original parts were offered at a significantly lower price than the original replacement parts (average of study: 62 %).
• Taking account of the availability of non-original parts in the required design, the costs of parts for the front damage was 74 % and for the rear damage 98 % in comparison with the exclusive use of original replacement parts.
• In repair tests, it was established that non-original parts show poorer accuracy of fit and the required fitting time is therefore significantly greater than where the use of original parts is involved.
• Taking account of painting costs, there remains a saving in repair costs – weighted by front, rear and side damage – of 5.4 %. Extrapolation to all vehicles gives a reduction in repair costs of 3.6%.
• In addition to the poorer quality, the matter of safety must be considered where non-originalparts are used. Tests carried out by the "Insurance Institute for Highway Safety“ show that the crash safety of your own car is not negatively affected by the use of non-original parts (Status Report, Vol. 35, No. 2, February 19, 2000).
• potential danger to other road users, especially pedestrians, in the case of the nonoriginal parts tested in the study arises from the bumper mouldings. In material tests with these bumper mouldings, material brittleness was observed at low temperatures with non-original parts. Bumpers made of such material represent an increased danger to pedestrians and should therefore be rejected.

Résumé: repair of accident damage to motor cars using non-original parts should at present be rejected.

Appendix 5

AFTERMARKET SPARE PARTS: "CENTRO ZARAGOZA CERTIFICATION PROCESS"

" It is a product whose quality has been verified by our TEST LABORATORY and which offers an appropriate confidence, according to the standards defined by CENTRO ZARAGOZA".

WHAT IS A CERTIFIED SPARE PART? AFTERMARKET SPARE PARTS CERTIFICATION PROCESS
Goal:

- To improve the quality level.
- To set up competitive markets.

That this PRODUCTIVE PROCESS is the APPROPRIATE one.

- That the spare part complies with the REQUIRED TECHNICAL SPECIFICATIONS.
- That this conditions are MAINTAINED ALL ALONG.

WHAT DOES IT IMPLY?

1. ASSESSMENT OF THE PRODUCTIVE PROCESS

- PRODUCT DEVELOPMENT
- EQUIPMENT
- SELF-CONTROL SYSTEMS
- QUALITY DOCUMENTATION

WHAT DOES IT IMPLY?

2. PRODUCT TEST AND INSPECTION

- MATERIAL USED
- FIT AND EXTERNAL APPEARANCE
- COATINGS
- ADDITIONAL CONTROLS

WHAT DOES IT IMPLY?
3. COMPLIANCE WITH PRODUCTION CONTROL AND FOLLOW-UP VISITS.
RANDOM SAMPLE TESTS OF PARTS TAKEN AT:

- Production facilities
- Distribution facilities
- Market

PROCESS:

- Application 3 years after
- Delivery of documentation

- Previous visit and sample taking
- Tests
- Certification
- Communication Committee
- Publication

The result of the Certification Process is the concession of a "Identifying Label's" Right of Use.

HOW IS IT IDENTIFIED?

CLASSES OF CERTIFICATION

- **E CLASS** - Equivalent quality material as the original car manufacturer………..... **Yellow label** The kind of material used:
- **D CLASS** □□ Different material as the original car manufacturer, but adequate for the part's functionality………….... **Lilac label**

TYPES OF D CLASS CERTIFICATION

- **NON GALVANISED** - The part is made of non galvanised steel
- **STEEL PART** - The part is made of steel
- **ABS PART** - The part is made of ABS

MATERIAL USED

- STEEL QUALITY (Chemical analysis and Tensile test)
- THICKNESS
- MASS
- CUPPING TEST

TEST FOR METAL SHEET PARTS (1)

- FIT AND EXTERNAL APPEARANCE
    - PREVIOUS INSPECTION
    - ADAPTABILITY

♦ Assembling time
♦ work process
♦ Accessories assembling

- PART POSITION
    - Gaps
    - Parallelism
    - Alignment
- FUNCTIONALITY

TEST FOR METAL SHEET PARTS (2)

PROTECTION AGAINST CORROSION

- THICKNESS
- ADHERENCE

- HARDNESS
- CRACK RESISTANCE
- CORROSION RESISTANCE

TESTS FOR METAL SHEET PARTS (3) - ADDITIONAL CONTROLS

- WELDING
  - Welded area
  - Distance between spots weld
  - Quality of spots weld
- SUB-STRUCTURES
  - Manufacturing material
  - Previous inspection
  - Functionality
- CRASH-TEST (bonnet)

TESTS FOR METAL SHEET PARTS (4) - MATERIAL USED

- PLASTIC QUALITY
  - Resistance to colour
  - Resistance to heat
  - Resistance to low temperatures impact
  - Resistance to fuel
- THICKNESS
- MASS

TESTS FOR PLASTIC PARTS - PART CONTROL

- PREVIOUS INSPECTION
- ADAPTABILITY
  - Assembling time
  - Work process
  - Accessories assembling
- PART POSITIONING
  - Gaps
  - Parallelisms
  - Alignments
- FUNCTIONALITY

TEST FOR PLASTIC PARTS - PAINTABILITY
ADHERENCE

- RESISTANCE TO HIGH PRESSURE – WASHING
- RESISTANCE TO SOLVENTS

TEST FOR PLASTIC PARTS – ADDITIONAL CONTROLS

- UNION SYSTEMS
  - Methods
  - Materials used
- SUB-STRUCTURES

    - Material
    - Functionality

TEST FOR PLASTIC PARTS - PART CONTROL (BUMPERS)

- LOW SPEED IMPACT
    - Front Crash-Test
    - Corner Crash-Test
- EXTERIOR FORM
    - Geometric forms
    - Orientation of surfaces
    - Hardness
    - Radius of curvature

Appendix 6

Thatcham Quality Assurance Manual (TQAM)

Requirements and guidelines for the quality accreditation of sites and parts

Table of Contents

1.0 Goal

The goal for Thatcham MIRRC's Quality System Manual ***TQAM*** is the description of activities that provide for fundamental quality systems focused towards continuous improvement, defect prevention and the reduction of variation and waste in the supply chain of Thatcham Accredited components.

2.0 Purpose

TQAM describes the fundamental quality expectations of Thatcham MIRRC for the manufacture and distribution of Thatcham Accredited components. Thatcham is committed to working with these operations to ensure customer satisfaction starting with the conformance to quality requirements, and continuing with waste and variation reduction to benefit the consumer, customer, insurance industry and the supply base.

3.0 Approach

TQAM is the harmonization of the accreditation processes of Thatcham. Each section of ***TQAM*** represents an element of the whole quality accreditation process.

Each section provides a "step by step" approach to becoming an "Approved" supplier and for manufacturers acquiring "Approved" status on components.

TQAM has been developed using the basis of international quality standards and automotive industry norms.

Section 1 – The Accreditation Process

1.1 Initial Accreditation

Thatcham MIRRC requires that suppliers establish, document and maintain effective quality systems based on principles of ***TQAM***. All requirements of ***TQAM*** are to be incorporated into a supplier's quality system.

For a supplier to initially supply components as "Thatcham approved" the following MUST be achieved.

- An approved site accreditation by the Thatcham accreditation function
- An approved Part submission per component (manufacturer only)

These two requirements must be met, **as a minimum**, for a component to be regarded as "Thatcham Approved".

The procedures for these two requirements are described in section 2 and section 3 of this document.

1.2 Ongoing accreditation

Thatcham MIRRC will monitor, on an ongoing basis, supplier performance in two areas

- Surveillance accreditation visits from Thatcham accreditation function

- Tracking of field concerns

These two requirements are described in section 4 and section 5 of this document.

These two indicators of ongoing performance will form the basis of whether a supplier is awarded continued "approved status".

Thatcham reserve the right to revoke, at any time, the approved status of the supplier site or a particular component

Section 2 – Site accreditation procedures

2.1 Fundamentals

Thatcham MIRRC expects that all suppliers and potential suppliers have an effective quality system in operation within their organization.

It is not a requirement that the system is third party certified, however this would be preferred. It is considered more essential that the system used at a supplier fits the business needs and is effective in assuring the quality of supplied components.

During the accreditation visit of the Thatcham accreditation function, "effective" quality system operation will be evaluated and reported as part of the assessment.

2.2 Assessment Method

The assessment method is composed of two key documents

- Thatcham Quality Accreditation Process for Manufacturers ***TQAP-M***

- Thatcham Quality Accreditation Process for Warehouses and Distributors ***TQAP-D***

These documents detail the areas that will be assessed during the accreditation visit. Each element will be judged as conforming or non-conforming from sampling of the quality system during the assessment.

TQAP-M and ***TQAP-D*** are available for all suppliers prior to assessment and can be positively utilized as a means of self-assessment or gap analysis.

2.3 Assessment Phases

The accreditation process will principally follow the following phases

2.3.1 Phase 1 – Initial contact and pre-assessment visit

This review determines if the supplier has the basic qualifications to commence into the Thatcham accreditation process. This stage is also an opportunity for the clarification of any unclear points between supplier and Thatcham. It also facilitates better understanding of the business operations creating a more efficient phase two.

2.3.2 Phase 2 – On Site Audit

This phase determines the degree and effectiveness of the implementation of the quality system at the supplier's site and any remote locations.
This phase utilizes ***TQAP-M*** and/or ***TQAP-D*** (available on request from Thatcham)

2.3.3 Phase 3 – Analysis and report

A review of the first two phases is used to determine supplier approval.

2.4 Audit Summary

The Thatcham auditor will determine the appropriate result of the assessment

Approved / not approved

Each of the elements of ***TQAP-M*** and /or ***TQAP-D*** will be evaluated and identified as "conforms" or "minor/major nonconformance".

After each assessment a comprehensive audit report will be issued clearly identifying the result and any further actions required. An example of the audit report format can be obtained from Thatcham MIRRC on request.

2.5 Definitions

2.5.1 A MAJOR NONCONFORMITY is either:

- The absence or total breakdown of a system to meet Thatcham accreditation requirements. A number of minor nonconformities against one requirement which when combined can represent a total breakdown of the system and thus be considered a major nonconformity.

- Any noncompliance that would result in the probable shipment of a nonconforming component. A condition that may result in the failure or materially reduce the usability of the components or service for their intended purpose.

- A noncompliance that judgement and experience indicate is likely either to result in the failure of the quality system or to materially reduce its ability to assure controlled processes and products.

2.5.2 A MINOR NONCONFORMITY is a Thatcham noncompliance that judgment and experience indicates is likely to:

- Result in the failure of the quality system, or

- Reduce it's ability to assure controlled processes or

- Result in the probable shipment of nonconforming product.

It is one or more observed lapse(s) in following a requirement of the organizations quality system.

2.5.3 AN OPPORTUNITY FOR IMPROVEMENT is an observed situation which is NOT a major or minor nonconformity, but where results achieved, based on the auditor's judgment and experience, are not optimal. These opportunities will be recorded in the final audit report.

CONFORMS – no major or minor nonconformities were noted in the audit.

In support of continuous improvement, the auditor will identify quality system strengths, weaknesses and will record opportunities for improvement.

2.6 Evaluation Process for accreditation status

An overall evaluation of "Approved" will be given when the audit does not identify any nonconformity

An "Approved P" status will be given under the following conditions

- A major nonconformity is noted in the audit or

- One or more minor nonconformity(ies) are noted in the audit.

This can be converted to “Approved” within an agreed timescale, with acceptance of satisfactory evidence of conformity and/or a robust corrective action plan, submitted to Thatcham for approval.
On site verification of these corrective actions is at the discretion of the Thatcham auditor.

An overall evaluation of “not approved” will be given if the audit process identifies more than one major nonconformity. Lack of nonconformity resolution within the agreed timescale will also result in “not approved” evaluation.

In summary, a supplier is able to be “Thatcham Approved” when they have the following status:

“Approved” – no actions required

“Approved P” – actions required

In these two cases a manufacturer will qualify to progress to the part level approval stage.

Where a supplier has been **“not approved”**, a reaudit can be scheduled based on the size and complexity of nonconformities found and a realistic timeframe for correction

Section 3 – Part approval procedures

3.1 Purpose

Thatcham Part Approval Process ***(TPAP)*** defines the generic requirements for Thatcham Accreditation. The purpose of the ***TPAP*** is to determine if all engineering, design and specification requirements are properly understood by a manufacturer and that the
process has the potential to produce product consistently meeting these requirements during an actual production run at the defined production rate.

3.2 Applicability

TPAP shall apply to manufacturers of parts and components.
A manufacturer of standard catalogue items shall comply with ***TPAP*** unless formally waived by Thatcham. Tooling shall be maintained for approved standard catalogue items as long as the items are offered or stated as being available.

3.3 Approach

The word "shall" indicates a Thatcham mandated requirement. The word "should" indicates a mandatory requirement with some flexibility in compliance methodology.

3.4 General Information

The manufacturer shall obtain full approval (See 3.6) the Thatcham accreditation activity for:

1. A new part or product (i.e., a specific part, material, or colour not previously supplied)
2. Correction of a discrepancy on a previously submitted part.
3. Product modified by an engineering change to design records, specifications, or materials.
4. Any situations required by Section 3.6.1

NOTE: If there is any question concerning the need for part approval, contact the responsible Thatcham accreditation activity.

3.5 *TPAP* process requirements

<u>*3.5.1 Specifications*</u>

The manufacturer shall ensure that any associated Thatcham specifications are met along with those detailed within the design record for all components designated for Thatcham approval.

The manufacturer **MUST** demonstrate the compliance to these specifications by suitable means.

The Thatcham accreditation activity must be satisfied that the above is met prior to part approval. Any ambiguous issues should be resolved between the manufacturer and Thatcham accreditation activity.

<u>*3.5.2 Significant Production Run*</u>

Product for ***TPAP*** shall be taken from a significant production run. This production run shall be from one hour to eight hours of production, and with the specific production quantity to total minimum of 100 **consecutive** parts, unless otherwise specified by Thatcham.

This run shall be manufactured at the production site using the tooling, gauging, process, materials and operators from the production environment. Parts from each unique production process e.g. duplicate assembly line and/or work cell, each position of a multiple cavity die, mould, tool or pattern, shall be measured and representative parts tested.

The ***TPAP*** samples submitted to Thatcham for approval shall be taken from this production run. This will ensure parts are "representative" of ongoing production.

The Thatcham accreditation activity shall specify if this production run should be witnessed by a Thatcham representative and TPAP parts marked accordingly prior to shipment to MIRRC for assessment.

3.5.3 TPAP Requirements

The product shall meet all identified specification requirements e.g. design record, Thatcham specifications and performance specifications. Any results that are outside specification are cause for the manufacturer not to submit the parts, documentation and/or records. Every effort shall be made to correct the process so that all design & specification requirements are met. If the manufacturer is unable to meet any of these requirements, Thatcham shall be contacted for determination of appropriate corrective action. Inspection and testing for ***TPAP*** shall be performed by a qualified laboratory. Commercial/independent test laboratories used shall be accredited facilities. When a commercial laboratory is used, the manufacturer shall submit the test results on the laboratory letterhead, or the normal laboratory report format. The name of the laboratory that performed the tests, and the date(s) of the tests, and the standards used to run the tests shall be indicated. **Blanket statements of conformance are unacceptable for any test results.**

The manufacturer shall have applicable items and records listed below, for each part, or family of parts, regardless of the part submission level. These records shall be in a ***TPAP*** part file, or referenced in such file and be readily available. The items below shall be readily available for Thatcham used in ***TPAP***.
The manufacturer shall obtain prior approval from the Thatcham accreditation activity for exceptions or deviations to ***TPAP*** requirements.

NOTE: The manufacturer may, upon special arrangements have tests performed by the Thatcham laboratories.

NOTE : All items or records may not necessarily apply to every part number from every manufacturer. For example, some parts do not have appearance requirements, and others do not have colour requirements. In order to determine with certainty which items must be included, consult the design record, e.g. part print, the relevant Engineering documents or specifications, and the Thatcham accreditation activities.

3.5.4 Design Records

The manufacturer shall have all design records for the saleable product, including design records for components or details of the saleable product. Where the design record, e.g. CAD/CAM math data, part drawings, specifications, is in electronic format, e.g. math data, the manufacturer shall produce a hard copy (e.g. pictorial, geometric dimensioning and tolerancing (GD&T) sheets, drawing) to identify measurements taken.

NOTE: For any saleable product, part or component, there will only be one design record, regardless of who has design responsibility. The design record may reference other documents making them part of the design record.

3.5.5 Process flow diagrams

The manufacturer shall have a process flow diagram in manufacturer-specified format that clearly describes the production process steps and sequence, as appropriate and meets the specified Thatcham needs, requirements and expectations.

NOTE: Process flow diagrams for 'families' of similar parts are acceptable if the new parts have been reviewed for commonality.

3.5.6 Process Failure Mode and Effects Analysis (Process FMEA)

The manufacturer should have a Process FMEA developed in accordance with, and compliant with TQAP-M requirements.

NOTE: A single Process FMEA may be applied to a process manufacturing family of similar parts or materials.

3.5.7 Dimensional results

The manufacturer shall provide evidence that dimensional verifications required by the design record and the Control Plan have been completed and results indicate compliance with specified requirements. The manufacturer shall have dimensional results for each unique manufacturing process, e.g. cells or production lines and all cavities, moulds, patterns or dies.

The manufacturer shall indicate the date of the design record, change level, and any engineering change documents not yet incorporated in the design record to which the part was made.

The manufacturer shall identify one of the parts measured as the master sample.

The manufacturer shall record the change level, drawing date, supplier name and part number on all auxiliary documents (e.g. supplementary layout results sheets, sketches, tracings, cross sections, CMM inspection point results, geometric dimensioning and tolerance sheets, or other auxiliary drawings used in conjunction with the part drawing). Copies of these auxiliary materials shall accompany the dimensional results according to the Retention/Submission Requirements Table.

NOTE: All dimensions (except reference dimensions), characteristics, and specifications as noted on the design record and Control Plan should be listed in a convenient format with the actual results recorded. The Dimensional Results form or a checked print where the results are legibly written on a part drawing including cross-sections, tracings, or sketches as applicable may be utilised for this purpose.

3.5.8 Records of material/performance test results

The manufacturer shall have records of material and/or performance test results specified on the design record or Control Plan.

3.5.9 Material Test Results

The manufacturer shall perform tests for all part(s) and product material(s) when chemical, physical, or metallurgical requirements are specified by the design record or Control Plan.

All tests required by the design record and related specifications should be listed in a convenient format along with the quantity tested and the actual results of each test. Also indicate any authorised engineering change documents that have not yet been incorporated in the design record.

The material test report shall indicate the:

- Design record change level of the parts tested and the number, date and change level of the specifications to which the part was tested:
- Date on which the testing took place

- Material subcontractor's name

3.5.10 Control Plan

The manufacturer shall have a Control Plan that defines all controls used for process control and complies with ***TQAP-M*** requirements.

NOTE: Control Plans for "families" or similar parts are acceptable if the new parts have been reviewed for commonality.

3.5.11 Part Submission Warrant (PSW)

Upon satisfactory completion of all required measurements and tests, the manufacturer shall record the required information on the Part Submission Warrant (PSW).

A separate PSW shall be completed for each part number unless otherwise agreed to by Thatcham.

If production parts will be produced from more than one cavity, mould, tool, die, pattern or production process, e.g. line or cell, the manufacturer shall complete a dimensional evaluation on one part from each. The specific cavities, moulds, line, etc., shall then be identified on the PSW, or in a PSW attachment.

The manufacturer shall verify that all of the measurement and test results show conformance with requirements and that all required documentation is available (or, for Level 2, 3, and 4, is

included in the submission). A responsible manufacturer official shall approve the PSW and provide date, title and telephone number.

NOTE 1: One warrant per part number can be used to summarise many changes providing that the changes are adequately documented and the submission is in compliance with Thatcham timing requirements.

NOTE 2: PSW's may be submitted electronically in compliance with Thatcham requirements, if any.

3.5.12 Part Weight (Mass)

If Specified the manufacturer shall record the part weight of the part as shipped on the PSW, measured and expressed in kilograms to four significant decimal places (0.0000). The weight shall not include shipping protectors, assembly aides, or packaging materials. To determine part weight, the manufacturer shall individually weigh ten randomly selected parts, calculate and report the average weight. At least one part shall be measured from each cavity, tool, line or process to be used in product realisation.

NOTE: This weight is used for Benchmarking weight analysis only and does not affect the approval process.

3.5.13 Sample Production Parts

The manufacturer shall provide sample product as requested by Thatcham and as defined by the submission request.

3.5.14 Master Sample

The manufacturer shall retain a master sample for the same period as the part approval records, or (a) until a new master sample is produced for the same part number for Thatcham approval, or (b) where a master sample is required by the design record, Control Plan or inspection criteria, as a reference or standard to be used. The master sample shall be identified as such, and shall show the Thatcham approval date on the sample. The manufacturer shall retain a master sample for each position of a multiple cavity die, mould, tool or pattern, or production process unless otherwise specified by Thatcham.

NOTE: When part size, sheer volume of parts, etc. makes storage of a master sample difficult the sample retention requirements may be modified or waived in writing by the responsible Thatcham Accreditation activity. The purpose of the master sample is to assist in defining the production standard, especially where data is ambiguous or in insufficient detail to fully replicate the part to its original approved state.

3.5.15 Checking Aids

If requested by Thatcham the manufacturer shall submit, with ***TPAP*** submission, any part-specific assembly or component checking aid.

The manufacturer shall certify that all aspects of the checking aid agree with part dimensional requirements. The manufacturer shall document all released engineering design changes that have been incorporated in the checking aid at the time of submission. The supplier shall provide for preventive maintenance of any checking aids for the life of the part.

NOTE: Checking aids can include fixtures, gauges, models, templates specific to the product being submitted.

3.6 Thatcham notification and submission requirements

3.6.1 Thatcham Notification

The manufacturer shall notify the responsible Thatcham accreditation activity of any design and process changes as indicated in the table below. Thatcham may subsequently elect to require a submission for ***TPAP*** approval (see below).

	Requirement	Clarification or examples
1.	Use of other construction or material than was used in the previously approved part or product.	For example, other construction as documented on a deviation (permit) or included as a note on the design record and not covered by an engineering change.
2.	Production from new or modified tools (except perishable tools), dies, moulds, patterns, etc., including additional or replacement tooling.	This requirement only applies to tools which due to their unique form or function, can be expected to influence the integrity of the final product. It is not meant to describe standard tools (new or repaired), such as standard measuring devices, drivers (manual or power), etc.
3.	Production following refurbishment or rearrangement of existing tooling or equipment.	Refurbishment means the reconstruction and/or modification of a tool or machine or to increase the capacity, performance, or change its existing function. This is not meant to be confused with normal maintenance, repair or replacement of parts, etc., for which no change in performance is to be expected and post repair verification methods have been established. Rearrangement is defined as activity which changes the sequence of product/process flow from that documented in the process flow diagram (including the addition of a new process). Minor adjustments of production equipment may be required to meet safety requirements such as, installation of protective covers, elimination of potential ESD risks, etc. These changes can be made without Thatcham approval unless the process flow is changed as a result of this adjustment.

4.	Production from tooling and equipment transferred to a different plant location or from an additional plant location.	Production process tooling and/or equipment transferred between buildings or facilities in one or more locations.
5.	Change of subcontractor for parts, non-equivalent materials, or services (e.g. heat-treating, plating) that affect customer fit, form, function, durability, or performance requirements.	Manufacturers are responsible for approval of subcontracted material and services that do not affect fit, form, function, durability, or performance requirements.
6.	Product produced after the tooling has been inactive for production for twelve months or more.	For product that has been produced after tooling has been inactive for twelve months or more:

7.	Product and process changes related to components of the production product manufactured internally or manufactured by subcontractors that impact fit, form, function, performance and/or durability of the saleable product. Additionally, the manufacturer shall concur with any requests by a subcontractor before submission to Thatcham.	Any change that affects Thatcham requirements for fit, form, function, performance and/or durability requires notification to the customer. **NOTE:** The fit, form, function, performance and/or durability requirements should be part of specifications as agreed.
8.	Change in test/inspection method – new technique (no effect on acceptance criteria)	For change in test method, manufacturer should have evidence that the new method provides results equivalent to the old method.

3.6.2 Submission to Thatcham

The manufacturer shall submit for ***TPAP*** approval prior to the first production shipment in the following situations unless the responsible Thatcham accreditation activity has waived this requirement.

The manufacturer shall review and update, as necessary, all applicable items in the ***TPAP*** file to reflect the production process, regardless of whether or not Thatcham requests a formal submission. The ***TPAP*** file shall contain the name of the responsible Thatcham accreditation activity person granting the waiver and the date.

	Requirement	Clarification or example
1.	A new part or product (i.e. a specific part, material, or colour not previously supplied.	Submission is required for a new product (initial release) or a previously approved product which has a new or revised (e.g. suffix) product/part number assigned to it. A new part/product or material added to a family may use appropriate ***TPAP*** documentation from a previously fully approved part within the same product family.
2.	Correction of a discrepancy on a previously submitted part.	Submission is required to correct any discrepancies on previously submitted part. A "discrepancy" can be related to: • The product performance against the Thatcham requirement • Dimensional or capability issues • Subcontractor issues • Full Approval of a part replacing an interim approval • Testing, including material, performance, engineering validation issues
3.	Engineering change to design records, specifications, or materials for production product/part number(s).	Submission is required on any engineering change to production product/part design records, specifications or materials.

3.6.3 Situations where Thatcham Notification is not required

Thatcham notification and submission (e.g. PSW) is not required for the situations described in the below table. The manufacturer is responsible to track the changes and/or improvements and update any affected ***TPAP*** documentation. The following examples are of manufacturing and quality systems situations and/or improvements.

NOTE: Thatcham notification is required any time product requirements for fit, form, function, durability and performance are affected.

	Requirement	Clarification or example
1.	Changes to component level drawings, manufactured internally or manufactured by sub-contractors, that do not impact the design record for the product supplied.	Changes which can not affect fit, form, function, durability or performance requirements.
2.	Tool movement within the same plant (used in equivalent equipment, no change in process flow, no disassembly of the tool) or equipment movement within the same plant (same equipment, no change in process flow).	Based on lean manufacturing initiatives, some equipment is designed for mobility, i.e. on wheels with quick disconnects. Cell configurations or location within a department may be changed without affecting process flow. No change made to process flow or control plan.
3.	Changes in equipment (same process flow with same basic technology or methodology).	Examples are new equipment, additional equipment, replacement, or change in equipment size.
4.	Identical gauge replacement	Gauges replaced as a part of a gauge maintenance or calibration system.
5.	Rebalance of operator job content with no change in process flow.	Lean manufacturing allows for re-balancing job content to eliminate bottleneck issues.

3.7 Submission to Thatcham – levels of evidence

<u>3.7.1 Submission Levels</u>

The Manufacturer shall submit the items and/or records specified by the level as requested by the Thatcham.

Level 1 Warrant only (and for designated appearance items, an Appearance Approval Report) submitted to Thatcham.

Level 2 Warrant with product samples and limited supporting data submitted to Thatcham.

Level 3 Warrant with product samples and complete supporting data submitted to Thatcham.

Level 4 Warrant and other requirements as defined by Thatcham.

Level 5 Warrant with product samples and complete supporting data available for review at the Manufacturer.

See Retention/Submission Requirements Table for exact requirements for each level.

The manufacturer shall use level 3 as the default level for all submissions unless specified otherwise by the responsible Thatcham accreditation activity.

NOTE 1: Thatcham will identify the submission level that will be used with each manufacturer.

NOTE 2: All of the forms referenced in this document may be replaced by Thatcham accreditation computer-generated facsimiles. Acceptability of these facsimiles is to be confirmed with the responsible activity prior to the first submission.

3.7.2 Retention/Submission Requirements Table

1. Requirement		**Submission Level**				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
1.	Design Records of Saleable Product	R	S	S	*	R
	- for proprietary	R	R	R	*	R
	components/details	R	S	S	*	R
2.	- for all other components/details	R	S	S	*	R
3.	Engineering Change Documents, if	R	R	S	*	R
4.	any	R	R	S	*	R
5.	Engineering approval, if required	R	R	S	*	R
6.	Design FMEA (if necessary)	R	R	S	*	R
7.	Process Flow Diagrams	R	S	S	*	R
8.	Process FMEA	R	S	S	*	R
	Dimensional Results					
9.	Material, Performance	R	R	S	*	R
10.	Test Results	R	R	S	*	R
11.	Initial Process Study	R	S	S	*	R
12.	Gauge Studies	R	R	S	*	R
13.	Qualified Laboratory Documentation	S	S	S	S	R
14.	Control Plan	S	S	S	*	R
	Part Submission Warrant (PSW)					
15.	Appearance Approval Report, (AAR)	R	S	S	*	R
16.	if applicable	R	R	R	*	R
17.	Sample Product	R	R	R	*	R
18.	Master Sample (See 3.5.13)	R	R	S	*	R
	Checking Aids					
	Records of Compliance					

With additional specified requirements:

S = The manufacturer shall submit to designated Thatcham accreditation activity and retain a copy of records or documentation items at appropriate locations, including manufacturing.

R = The manufacturer shall retain at appropriate locations, including manufacturing and make readily available to the Thatcham representative upon request.

* = The manufacturer shall retain at appropriate locations, and submit to Thatcham upon request.

3.8 Part submission status

3.8.1 General

The manufacturer shall be notified by Thatcham of the disposition of the submission. After part approval, manufacturers shall assure that future production continues to meet all requirements.

NOTE: For those manufacturers that have been classified as "self certifying" by Thatcham, submission of the required documentation showing manufacturer approval will be considered as Thatcham approval unless the manufacturer is advised otherwise.

3.8.2 Thatcham PAP Status

Full Approval indicates that the part or material meets all specifications and requirements. The manufacturer is therefore authorised to ship production quantities of the product subject to releases from the Thatcham accreditation activity.

Interim Approval permits shipment of parts on a limited time or piece quantity basis. Interim Approval will only be granted when the manufacturer has:

- clearly defined the root cause of the non-conformities preventing part approval

and

- prepared an interim approval action plan agreed upon by Thatcham. Re-submission to obtain "full approval" is required.

Parts covered by an interim approval that fail to meet the agreed-upon action plan either by the expiration date or the shipment of the authorised quantity will be rejected. No additional shipments are authorised unless an extension of the interim approval is granted.

Rejected means that the submission, the production lot from which it was taken, and accompanying documentation do not meet Thatcham requirements. Corrected product and documentation shall be submitted and approved before production quantities may be shipped.

3.8.3 RECORD RETENTION

Thatcham part approval records (see 3.7.2) regardless of submission level, shall be maintained for the length of time that the part is active plus one calendar year.

The manufacturer shall ensure that the appropriate ***TPAP*** records from a superseded part ***TPAP*** file are included, or referenced in the new part ***TPAP*** file.

NOTE: An example of an appropriate document/record that should be carried forward from the old file to the new part file would be a material certification from a raw material supplier for a new part that represents only a dimensional change from the old part number. This should be identified by conducting a ***TPAP*** "gap analysis" between the old and new part numbers.

3.8.4 ACCREDITED PRODUCT IDENTIFICATION

All approved parts shall be identified as specified by the Thatcham accreditation activity. Labels have been designed and developed by Thatcham to reduce the risk of fraud and provide a distinguishable mark for customer recognition of a Thatcham accredited part.

SECTION 4 – Consumer complaints process

4.1 Field concerns

The following details responsibility for initiating a FFR

Thatcham's accreditation activity will, where ever provided, take on board any complaints or comments of an adverse nature pertaining to accredited products and will respond to these accordingly. If deemed necessary Thatcham will register the complaint with the manufacturer / distributor in the form of a FFR.

Where considered necessary Thatcham will retrieve a product relating to complaints and assess the concern

Note. The manufacturer / Distributor shall notify Thatcham of any instance of multiple product defect and advice on action taken.

4.2 Actioning and completing the FFR

In the event of a manufacturer / distributor receiving an FFR the manufacturer / distributor shall immediately initiate containment action.

As a minimum, this will involve immediate temporary corrective action (e.g 100% inspection) for those parts within the storage and / or manufacturing process and, where ever possible, in transit.

The manufacturer / distributor must stop shipment of non-conforming products from their inventory.

The manufacturer / distributor must work immediately to establish corrective actions on the identified problem, clearly identifying the following

a) The root cause of the nonconformance.
b) The root cause of the non-detection of the problem by the manufacturer/distributor process.
c) Permanent countermeasures to the problem including implementation timing.
d) Permanent countermeasure to the non detection of the problem by the manufacturer/distributor process including implementation timing.
e) How the effectiveness of the countermeasures have been confirmed.

Manufacturers/distributors are encouraged to add extra sheets if the answer space on the FFR is insufficient.
Thatcham also encourage supporting data in terms of photographs to aid problem understanding.

4.3 Monitoring and progressing the FFR

The FFR must be actioned within 30 days of the "raised date", failure to action within this time could result in an adverse affect on the product approval status and may also effect the manufacturer / distributor accredited status.

Once actioned and completed a copy of the completed FFR must be returned to Thatcham, clearly indicating countermeasures.

Thatcham will monitor the responses to the FFR's and will audit the process at individual sites on a periodic basis. Should the Thatcham accreditation activity deem the responses to FFR's ineffective then the manufacturer/distributor shall reassess his corrective actions and resubmit.

Where continued field concerns are occurring, or a specific concern is repeated from a particular manufacturer or distributor this shall result in a review and possible revocation of a suppliers "approved" status.

Note: during a site assessment the manufacturer or distributor **must** be able to demonstrate the effective management of the FFR system.

Section 5 – Ongoing performance monitoring

5.1 Surveillance site assessment visits

On an annual basis the Thatcham accreditation activity shall review the continuing compliance of an approved facility to the Thatcham standards.

This is aimed at

- Ensuring the organization continues to meet the Thatcham requirements
- Promote and help drive continuous improvements
- Give feedback to a facility as to performance within the Thatcham scheme

This surveillance assessment will make recommendations for continued approval or identify areas of a site that require corrective actions. If a facility is found not to meet the required Thatcham standards during a surveillance assessment, approved status may be temporarily removed. This status would only be re-instated once corrective actions have been made.

A full report will be issued, by Thatcham, after each surveillance visit.

5.2 Product Auditing

The manufacturer shall resubmit product for audit purposes every 2 years, unless otherwise agreed with the Thatcham accreditation activity, accompanied by new TPAP documentation.

This product audit will verify the component against the original ***TPAP*** sample submission from the manufacturer.

The auditing process will also check packaging standards and labeling conformance. Should a problem be found during this evaluation, then that component shall have its approved status removed, unless otherwise agreed with the Thatcham accreditation activity, and a bulletin will be issued to the complete supply chain to that effect.

After a concern has been highlighted the manufacturer will be required to submit a full ***TPAP*** before re-instatement of component approval.

Note. Once a manufacturer has had approved status removed from a component there must be **NO** further supply of that component using Thatcham approved markings until the ***TPAP*** is re-approved from the Thatcham accreditation activity.

5.3 Field Feedback Reports

Thatcham takes the feedback from the field very seriously, and as a consequence any continuing poor product performance from manufacturers will result in removal of approved status.

For the distribution network, any continuing mis-treatment or damage caused to products will also result in removal of approved status.

Effective management of the FFR system will be a key indicator to Thatcham for recommending continued approval of manufacturers and distributors. Facilities are expected to use the FFR system as an opportunity to improve their products and services.

Appendix A – Acronyms and Terms

CAD/CAM MATH DATA is a form of design record by which all dimensional information necessary to define a product is conveyed electronically. When this design record is used, the manufacturer is responsible for obtaining a drawing to convey results of dimensional inspection.

CALIBRATION is a set of operations which compare values taken from a piece of inspection, measuring and test equipment or a gauge to a known standard under specified conditions.

CAPABILITY is the total range of inherent variation in a stable process.

CHECKED PRINT is a released engineering drawing with **actual measurement results** recorded by the manufacturer adjacent to each drawing dimension and other requirements.

CONFORMANCE means that the part of material meets specifications and requirements.

CONTROL PLANS are written description of the system for controlling production parts and processes. They are written by manufacturers to address the important characteristics and engineering requirements of the product. Each part must have a Control Plan but in many cases, "family" Control Plans can apply to a number of parts produced using a common process.

CRITICAL CHARACTERISTIC Ford definition: Critical characteristics are those product requirements (dimensions, performance tests) or process parameters that can affect compliance with government regulations or safe vehicle/product function and which require specific supplier, assembly, shipping or monitoring and inclusion on Control Plans. Critical characteristics are identified with the inverted delta symbol.

DESIGN RECORD is the part drawing, specifications and/or electronic (CAD) data used to convey information necessary to produce a product.

DOCUMENTATION is material (typically paper or electronic) defining the process to be followed e.g. quality manual, operator instructions, graphics, pictorials.
ENVIRONMENT is defined as all of the process conditions surrounding or affecting the manufacture and quality of a part or product. Environment will vary for each site, but generally includes; housekeeping, lighting, noise, HVAC, ESD controls and safety hazards relating to housekeeping. See Production Environment.

FAILURE MODE AND EFFECTS ANALYSIS (FMEA) is systematised technique which identifies and ranks the potential failure modes of a design or manufacturing process in order to prioritise improvement actions.

FULL APPROVAL is used in **TPAP** to indicate that the part or production material meets all specifications and requirements. The manufacturer is therefore authorised to ship production quantities of the part or material subject to releases from Thatcham accreditation activity.

INITIAL SAMPLE is a term previously used for production part submissions.
INTERIM APPROVAL is used in **TPAP** to permit shipment of products for a specified time period or quantity.

LABORATORY is a test facility that may include chemical, metallurgical, dimensional, physical, electrical, reliability testing or test validation.

PART SUBMISSION WARRANT is an industry-standard document required for all newly-tooled or revised products in which the manufacturer confirms that inspections and tests on production parts show conformance to requirements.

PERISHABLE TOOLS are drill bits, cutters, inserts, etc. used to produce a product and which are consumed in the process.

PROCESS is a combination of people, equipment, methods, materials and environment that produces output, a given product or service. A process can involve any aspect of a business.

PROCESS FLOW DIAGRAM depicts the flow of materials through the process, including any rework or repair operations.

PRODUCTION ENVIRONMENT is the manufacturing location within the production site which includes the production tooling, gauging, process, materials, operators, environment, and process settings, e.g. feeds, speeds, cycle times, pressures, temperatures, quoted line rate. Environment is defined as all of the process conditions surrounding or affecting the manufacture and quality of a part or product. Environment will vary for each site, but generally includes: housekeeping, lighting, noise, HVAC, ESD controls and safety hazards relating to housekeeping.

PRODUCTION PART is manufactured at the production site using the production tooling, gauging, process, materials, operators, environment and process settings, e.g. feeds/speeds/cycle times/pressures/temperatures.

THATCHAM PART APPROVAL SUBMISSION is based on specified quantities of production parts or production materials taken from the significant production run made with production tooling, processes and cycle times. These parts or materials submitted for production part approval are to be verified by the manufacturer as meeting all specified requirements from the design record.

QUALITY PLANNING is a structured process for defining the methods (i.e. measurements, tests) that will be used in the production of a specific product or family of products (i.e. parts, materials). Quality planning embodies the concepts of defect prevention and continuous improvement as contrasted with defect detection.

QUALITY RECORD is a documented evidence that the manufacturer or distributor processes were executed according to the quality system documentation e.g. test results, internal audit results, calibration data and which records the results. See **QS-9000,** cl. 4.16.

REGULAR PRODUCTION TOOLING is the tooling with which the manufacturer intends to produce production product.

REJECTED used in **TPAP** to mean that the Thatcham part submission and/or documents did not meet the requirements. The manufacturer must correct the production process and make a new submission. (Advise the Thatcham accreditation activity of the date when corrected parts will be available.) Do not ship production parts until Thatcham approves the corrected parts.

REMOTE LOCATION is a location at which production processes do not occur e.g. does not fit the definition given for **Site** but which support such sites.

RISK PRIORITY NUMBER (RPN) The risk priority number is the product of the severity (S), occurence (O), and detection (D) rankings. Within the scope of the individual FMEA, this value can be used to rank order the concerns and the process.

SELF-CERTIFYING MANUFACTURER is a supplier that an authorised Thatcham representative has designated as "self-certifying" which means that the manufacturer submits the PSW (e.g. Level 1 TPAP) to Thatcham but the response from Thatcham is not necessary. This designation is to be documented. The PSW submittal from a self-certifying manufacturer results in a simultaneous "approval" status by Thatcham for that submittal, which may not be a "full approval".

SIGNIFICANT PRODUCTION RUN is manufacture of a lot consisting of a minimum of 100 consecutive pieces, or other quantity as agreed to by the Thatcham accreditation activity, and from a minimum of one hour of production from the production environment.

SITE is defined as a manufacturer or distributor location at which value-added processes occur. "Site" also includes distributors of parts manufactured by other companies. External locations which only stage material for onward shipment, indirect material suppliers or assembly plants are not included.

SPECIFICATIONS are engineering requirements for judging the acceptability of a part. For the Thatcham part approval process, every feature of the product as identified by engineering specifications must be measured. Actual measurement and test results are required. Specifications should not be confused with control limits which represent "the voice of the process".

STABLE PROCESSES are processes that are in statistical control. Variation in the output of a stable process arises only from common causes. A stable process is predictable. For initial process studies performed prior to Thatcham part submission, tests for stability may not be as rigorous as those used for ongoing processes.

SUBCONTRACTORS are defined as providers of production materials, or production or service parts, directly to a manufacturer or distributor. Also included are providers of heat treating, painting, plating or other finishing services.

SUPPLIERS are defined as providers of: (a) production materials (b) production or service parts or (c) heat treating, plating, painting or other finishing services. This also includes distribution service.

STATISTICAL CONTROL is the condition of a process from which all special causes of variation have been eliminated and only common causes remain. Statistical control is evidenced on a control chart by the absence of points beyond the control limits and by the absence of any non-random patterns or trends.

SUBMISSION LEVEL refers to the level of evidence required for Thatcham part submission.

TOOL is defined as the portion of process machinery which is specific to a component or sub-assembly. Tools (or tooling) are used in process machinery to transform raw material into a finished part or assembly.

TOOLING MAINTENANCE is the periodic sharpening, polishing, or other servicing of a tool. This maintenance will not significantly affect the dimensions or other characteristics of the product produced by the tool. (Contrasts with **TOOLING REFURBISHMENT)**

TOOLING REFURBISHMENT is the major overhaul of a tool. Refurbishment can affect dimensions or other characteristics of the product produced by the tool. Thatcham part approval submission of product made with refurbished tools is required before such product may be shipped.

VALIDATION is confirmation by examination and provision of objective evidence that the particular requirements for specific intended use are fulfilled.

VARIABLES DATA are quantitative results where measurements are used for analysis. Examples include the diameter of a bearing journal in millimeters, the closing effort of a door in newtons, the concentration of an electrolyte in percent, and the torque of a fastener in Newton-meters.

WARRANT – see Part Submission Warrant.

Appendix 7

Overview: What is CAPA?

About CAPA | Policies and Process | Objectives

About CAPA

The Certified Automotive Parts Association is a non-profit organization that certifies the quality of automotive parts used for collision repairs. CAPA oversees a testing and inspection program that certifies the quality of automotive parts used for collision repairs. CAPA ensures that parts meet quality standards for fit, component materials, and corrosion resistance. CAPA is not a manufacturing, marketing or sales organization. The CAPA program provides consumers, auto body shops, part distributors and insurance adjusters with an objective method for evaluating the quality of certified parts and their functional equivalency to similar parts manufactured by automotive companies. CAPA was founded to promote price and quality competition in the collision part industry, thereby reducing the cost of crash repairs to consumers without sacrificing quality.

CAPA Policies and Process

CAPA's policies are set by a nine-member Board of Directors representing auto body shops, consumer groups, insurance companies and part distributors. CAPA's independent validator conducts the testing, inspection and compliance aspects of the program. Only competitive auto body parts that meet or exceed CAPA Quality Standards for fit, materials, and corrosion resistance are allowed to display the CAPA Quality Seal and are listed in a directory, which is widely available to the crash parts industry. CAPA has a Technical Committee made up of experts in the collision repair and auto body part industry. This committee performs periodic, in-depth reviews of the Standards, refining them as required, to assure the continued quality of CAPA certified parts.

CAPA Objectives

To **Develop** quality standards for the manufacture of competitive auto body parts.

To **Ensure** that parts bearing the CAPA Quality Seal are in compliance with CAPA Quality Standards.

To **Provide** independent laboratory participation in the program to ensure integrity and conformity to generally accepted guidelines for third-party certification programs.

To **Publicize** the certification program to users -- consumers, auto body shops, insurance companies, government agencies, collision repair estimators and distributors.

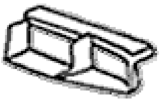
What CAPA Certifies

CAPA 101 - Metals | CAPA 201 - Plastics | CAPA 301 - Lighting

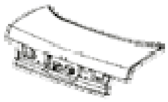
CAPA quality standards apply to various types of parts made from different materials. CAPA is constantly expanding the certification program to include more parts and new materials. Currently, three specifications that set quality standards for metal (CAPA 101), plastic (CAPA 201) and lighting (CAPA 301) are in place. Each specification provides detailed testing and inspection procedures to ensure the quality of the parts covered by that specification. Where possible, all test procedures refer to the nationally recognized tests such as those of ASTM and SAE.

CAPA 101 - Metals

Metal parts that are primed, decoratively painted, plated with metallic coatings, or painted and plated with metallic coatings are covered, including:



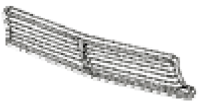
Bezels



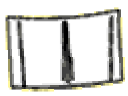
Deck Lids

Door Shells

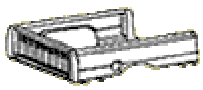
Fenders



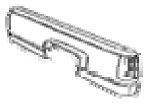
Grilles



Hoods

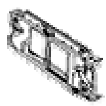


Pickup Beds

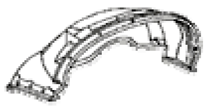


Pickup Box Sides

Quarter Panels



Radiator Supports



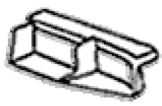
Wheel Houses

Tailgates

(The standard does not cover metal or chrome bumpers)

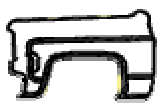
CAPA 201 - Plastics

Plastic parts that are unprimed, primed, decoratively painted, plated with metallic coatings, or painted and plated with metallic coatings are covered, including:

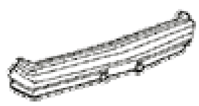


Bezels

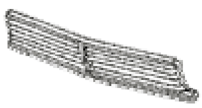
Bumper Covers



Fenders

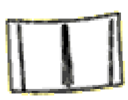


Fascias, Front / Rear

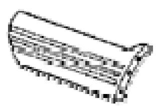


Grilles

Header Panels



Hoods



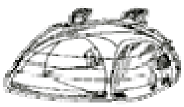
Side Mouldings

The CAPA 201 specifications include requirements for:

- Adhesive integrity
- Appearance
- Assembly requirements
- Coating performance
- Dimensional Checks
- Fasteners
- Hardware
- Materials analysis
  (composition, mechanical properties)
- Production requirements
- Quality control procedures
- New Part Approval Vehicle Test Fit (VTF), as applicable

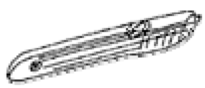
CAPA 301 - Lighting

CAPA 301 for Lighting was approved by the CAPA Technical Committee in March 2002. Automotive lighting parts are covered, including:

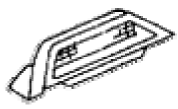


Headlamps

Taillamps



Side Markers



High-Mounted Brake Lights

The CAPA 301 specifications include requirements for:

- FMVSS 108 Compliance, Initial and Ongoing
- Dimensional Verification
- Physical Dimensions and Effective Projected Luminous Lens Area
- Electrical and Power
- Illumination, Photometry, and Color
- Life and Durability Requirements
- Gaskets, Adhesives, Sealants, and Auxiliary Equipment
- Aiming Devices
- Metallurgical/Material Analyses
  (composition, mechanical properties)
- Appearance
- Production
- Quality Control Procedures
- New Part Approval Vehicle Test Fit (VTF)

Additional part types will be added as appropriate

Appendix 8

Text of article posted on the ABP Website
(7th August 2006)

As new cars become significantly more complex, requiring new advanced repair equipment and manufacturer-specific repair methods, attempts to reduce repair costs by insurance companies could result in increased risk of injuries or fatalities if repaired cars are involved in any subsequent accidents, according to a new research study on the car repair industry. It says independent bodyshops need to invest in new equipment and techniques, but many are not making enough money to do so.

Report co-author and Trend Tracker Limited director Robert Macnab explains:

"Motorists who choose a bodyshop themselves should ensure that it's competent for the job, and insurers could be in breach of their duty of care obligations if repaired cars are involved in subsequent accidents involving injuries or loss of life, particularly where an insurer has intervened and prescribed a cost-saving alternative repair method to that specified by the manufacturer."

Insurers, adds Macnab, will increasingly need to employ specialist, manufacturer-approved bodyshops capable of repairing specific types of car or specific types of damage.

These are just some of the findings from a new wide-ranging research study[35] into the future of the car body repair market in the UK published by Trend Tracker under its MFBI market study brand, which notes that manufacturers under pressure to produce lighter, stronger and safer cars are using new materials including high strength and ultra high strength steels, aluminium and plastic composites which cannot be repaired properly with traditional techniques. As well as using new materials, vehicles are being designed to perform (or deform) in specific ways that protect both their occupants and pedestrians.

Phase 2 of the EU pedestrian safety legislation to be implemented by 2010 will require significant changes to vehicles' front-end design and construction. And as vehicle construction becomes more complex, both in terms of the vehicle structure and the use of more active-safety electronic systems, vehicle manufacturers are increasingly stipulating make- or model-specific repair methodologies to maintain structural and systems integrity.

Over the next few years, bodyshops will need to invest in new equipment and training to repair the latest-generation vehicles, but many are making too little money to afford that investment – with annual net profits as low as £28,000 on sales

[35] The Car Body Repair Market in the UK, published August 2006, info@trendtracker.co.uk

of over £1.2m. Already a growing number of car repairs placed within insurers' approved networks have needed remedial work or specialist attention from the vehicle manufacturers' approved repairers.

Unless the bodyshop members of insurers' approved repair networks are able and willing to invest in new techniques, insurers will need to place more accident-damaged cars with the relevant manufacturer's approved repair network, to avoid any potential duty of care liabilities. At present, a high proportion of insurers' approved bodyshops comprises independent rather than manufacturer-approved bodyshops.

Carmakers require their own franchised dealers with bodyshops to make the necessary investments as part of their franchise agreement, but the MFBI report shows that bodyshops are typically paid only £23.50 per hour for insurance repairs, whereas a dealership's service department can charge a labour rate almost twice as high at £44.50.

If insurers are forced to place a higher proportion of repairs with manufacturer-approved dealer bodyshops, these are likely to seek higher labour rates for approved body repairs, which could help drive up insurance premiums.

The risk is greatest when cars suffer structural damage during an accident. The MFBI study shows that structurally damaged cars currently account for up to 40% of all current repairs, after allowing for a rising proportion of total losses. The study recommends that repairs should be assessed for damage severity and then sent to a specialist repairer capable of carrying out the correct repair.

The study suggests that pre-repair assessment centres will be needed to establish the type of repair needed before a car is sent to a bodyshop for repair, and not after, as tends to be the practice at present.

Overall, the MFBI study shows that the repair of vehicles is experiencing a step-change in terms of technology and expertise, and insurance companies will have to respond with care to avoid an increasing liability risk – and motorists would be well advised to ensure that they do so.

<u>Comments from a retired director of Thatcham</u>

We have moved to a recommendation for a European Repair Standard with the logic that repair is more critical to safety than cosmetic parts. Have we made enough of the point that vehicle structures have moved rapidly from similar mild steel which a repair with a skilled welder, panel beater could repair safely, to vehicles into which the VMs have introduced a wide range of 'exotic' materials to lightweight the vehicle (emissions) whilst increasing strength (occupant safety), and that these materials must be repaired on a vehicle-, panel- and join-specific repair method to ensure the repaired vehicle has the strength of the original EuroNCAP rated structure ?

There is no generic repair method for HSS and UHSS. The steel manufacturers of the 420 grades of steel, and the vehicle manufacturers demand DIFFERENT repair techniques for the IDENTICAL grade of high strength steel in the IDENTICAL STRUCTURAL position in a vehicle - eg 'B' post in Vectra and Volvo with SAME grade of HSS are repaired differently. Heat treating these high strength steels as per a conventional repair destroys the molecular structure and degrades the very strength of the 'high' and 'ultra high' strength steel. Clean rooms are needed to repair aluminium structures as in the BMW 5, Audi, Jaguar and I think Honda, to ensure no cross contamination via tools etc from steel, which will result in corrosion and weakening of the structure. Production techniques such as laser stitch welding produce a good build quality on the assembly line but are impossible to replicate in repair, again requiring vehicle-specific repair methods.

Two further factors compound this. First the rapid increase in new model launches: the old Mini, Beetle, Golf were with us for 40 years, the new Mini has its successor emerging after just 4 years. Second the increase in brands on the market and the trend to premium, whereby BMW3 practically outsells Ford Mondeo in the UK - old mild steel 'repair it with your eyes closed' model replaced in volume by 'eyes open to read the manual' demanding vehicles - for which it is just an impossible nightmare for the independant repairer to find the vehicle-, panel- and join-specific repair information vehicle by vehicle.Such is the rate of change that even within VM's there is no consistency - so if a repairer has understood the BMW 1, he has not understood the 3, 5, 6,7 etc etc. Knowing aluminium in the Audi does not mean you understand the repair of aluminium in the Jaguar.

Safe repair demands vehicle-, panel- and join-specific repair methodologies, executed by a trained competent technician. Beyond the conclusion that repair is the more important factor, it is this huge sea change that has crept up on the repair market and for which many repairers, public authorities, consumer protection bodies, etc are totally unaware. Repairs carried out that weaken the structure may them be totally hidden to even knowledgeable inspection by a good cosmetic repair (of the very 'design right' panels the VMs seek to protect!)

Appendix 9

Organisations and persons contacted

We contacted a large number of organisations and inviduals, obtained information from many of them, and were able to hold face-to-face and telephone discussions with others:

- All the vehicle manufacturers and their importers of significance in the UK and held discussions with three of them, plus one in Germany
- Manufacturer contacts were then taken over and centralised via ACEA, whose response to our questions is included in the report, and who we met in Brussels
- The Association of British Insurers (ABI)
- All the UK motor insurers represented on the Thatcham Engineering Technical Sub-Committee (ETS) and held discussions with two of them
- BSI, the British Standards Institute
- The Comité Européen des Assurances, in Paris
- SRA, the information publishing arm of the French motor insurers
- GDV in Germany
- EurAPCo, in Zürich
- The three UK body repairers' trade associations, RMIF, VBRA and MVRA
- Febelcar in Belgium, ZKF in Germany
- BRIC, the Body Repair Industry Campaign, in the UK
- The European body repairers' federation, AIRC
- A major European accident management company
- The largest European vehicle leasing company
- ECAR
- The European independent parts distributors' federation, FIGIEFA
- The French automotive components industry federation, FIEV
- Norauto, the major French auto centre chain
- National independent parts distributors' trade associations in France (FEDA) and Germany (GVA)
- Individual body repair parts distributors in the UK, France, Italy and Belgium
- ISAM, a non-OE bumper producer in Italy
- The two largest estimating systems providers in Europe, Audatex and Glassmatics
- Major testing and certification institutions: MIRA, TRL, VCA, VOSA and Thatcham in the UK; UTAC in France; TüV Rheinland, KTI and AZT in Germany; CZ (Centro Zaragoza) in Spain; TNO in the Netherlands; CAPA from the USA; EuroNCAP
- Motoring organisations: ADAC in Germany, the AA and RAC in the UK
- The UK Department for Transport
- A number of individuals involved in the body repair sector, who had attended the 2006 IBIS conference

We thank all the respondents for their time, thoughtful contributions and information.