New requirements relating to the provision of assistance to road-accident victims: recent developments in France

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ABSTRACT

In 2002, following the deaths of a number of firefighters attending road-accident scenes, the French Interior Minister Nicolas Sarkozy asked Colonel Pourny of the fire department to "conduct an analysis of the full range of missions carried out by firefighters and put forward proposals aimed at improving active and passive safety on the ground". In light of the recommendations of the "Pourny report", the French Directorate of Civil Defence and Security or DDSC (*Direction de la Défense et de la Sécurité Civiles*), decided to set up a joint working group with French car manufacturers. The group – which was set up in the spring of 2005 – was required to make improvements in the methods employed by teams working on damaged vehicles at accident scenes, the aim being to facilitate rescue work and enhance firefighter safety. Such improvement is vital given that recent vehicles (coupé-cabriolets in particular) are increasingly difficult to cut because of the reinforcements and impact-resistant materials used to protect passengers in the event of a collision.
After a year's collaboration, the working group decided to focus on two complementary initiatives:

- The creation of an "extrication card" for distribution to French fire brigades;
- The organization of extrication exercises for active-service firefighters, using recent vehicles.

A detailed, illustrated presentation will be made of each of these initiatives, thereby raising awareness of the technical information contained in the extrication cards distributed to French firefighters since July 2006.

Details of pilot exercises will also be provided.

CONTEXT AND ISSUES

In 2002, following the deaths of a number of firefighters attending road-accident scenes, the French Interior Minister Nicolas Sarkozy asked Colonel Pourny of the fire department to "conduct an analysis of the full range of missions carried out by firefighters and put forward proposals aimed at

In his report, Colonel Pourny stressed that a better cooperation between the firefighters and the carmakers could change dramatically the operations during road accidents in order to make them safer. The French Directorate of Civil Defence and Security or DDSC (*Direction de la Défense et de la Sécurité Civiles*) therefore took the lead of a new initiative.

A first high-level guideline meeting between the DDSC and the French car manufacturers was held early in 2005. In an extension of the Pourny report, the DDSC listed some initiatives to be undertaken for discussion with the car manufacturers. In the end, this meeting confirmed the commitment of the French car manufacturers to working with the various segments of French road emergency services to make progress in resolving the more and more frequently occurring problem of extricating people from new vehicles. In fact, there was more and more feedback from firefighters working in the field to emphasize how difficult, even dangerous, it is for rescuers to cut victims free from new vehicles which have been involved in accidents.

Although official statistics do not currently make it possible to specifically identify which accidents are linked to extrication operations, we have been able to observe, after careful analysis of the Ministry's accident analysis data for the year 2005, that 14 serious work accidents (person unable to work for at least one week) were probably caused by an operation to cut someone free from wreckage. It also emerged from this analysis that most injuries are caused to the hands (cuts, muscle / tendon / ligament wounds, crushing, amputation, etc.)

During this period, the most difficult vehicles to free people from according to the firefighters were the Peugeot 206 CC, the Renault Vel Satis and the Smart City Coupé. These three vehicles of the latest design, naturally praised for their excellent respective results in the Euro NCAP tests are in fact a representative sample of the new difficulties facing the firefighters: reinforced structures, metal inserts, innovative pyrotechnic devices, etc. All these new and effective systems used to save the occupants in a violent impact become the rescuers' enemies during rescue operations. The paradox is undeniable but unfortunately very real!

These reports really made French car manufacturers aware of the emergence of a new problem. They have already generally done excellent work in terms of protecting occupants in

an accident (many vehicles scored 5 stars according to the Euro NCAP rating; Peugeot 1007 best score for occupant protection, all categories combined, Citroën C6 only car to obtain 4 stars in a pedestrian impact, etc.). However, the manufacturers are now certain that they have no option but to succeed in this "extrication" campaign.

The first real work session took place in the spring of the same year. The members of the working party met together round the same table for the first time. There were:

- 2 persons from the DDSC (Ministry of the Interior), responsible for managing the "extrication" initiative on behalf of the *Sous-Direction des Services de Secours* (Emergency Services Sub-Department);
- 2 persons from the Paris Fire Brigade (BSPP). The BSPP is an elite force reporting to the Ministry of Defence and its personnel are often called on for assistance in improvement schemes relating to the technical development of the work of firefighters in France;
- 1 person from the Essonne *Service Départemental d'Incendie et de Secours* (SDIS: regional Fire and Emergency Service). This experienced person, who is a specialist in extrication techniques, was and still is the principal instructor on this subject at the *Ecole D'Incendie et de Secours* (EDIS: Fire and Emergency School) in the Essonne *département*;
- 2 persons from PSA Peugeot Citroën, one of whom is the secondary safety (passive safety) department manager of the Group's Technical Department;
- 2 persons from Renault, holding the same posts as those from PSA Peugeot Citroën.

Of course, the composition of the working party would have to be modified from time to time, bringing in new skills or releasing others, but the main members listed above were always represented in the "hard core" and were among the most active.

The structure of the working party can be explained quite logically because it reflects the complex organization of the players at the French firefighters' level. Apart from Paris and Marseille, where the personnel report to the Ministry of Defence, fire brigades come under the authority of the *départements* within a body called the *Service Départemental d'Incendie et de Secours* (SDIS: regional fire and emergency service). These firefighters in the field are either full-time professionals or part-time volunteers from other trades. Their building facilities, vehicles, salaries, etc. are provided by the local authorities, the regional councils, which naturally causes some disparity between rich *départements*, often industrialized with a high population density, and rural areas with less people. Laws governing the emergency services and the firefighters' profession, rules covering heavy equipment (communication, aircraft, etc.), training, etc. are placed under the responsibility of the *Direction de la Défense et de la Sécurité Civiles* (Directorate of Civil Defence and Security), reporting to the Ministry of the Interior, which thus ensures the overall cohesion of the whole system at national level.

EXTRICATION CARD: THEORETICAL ASPECT

Specifications and requirements

The group met several times during the year 2005 to specify exactly what is necessary on this extrication card. They decided that:

- only useful information should be shown.
- all the data should be contained in a single-sheet (double-sided) document.
- a template should be designed to ensure that every car manufacturer puts the same pieces of information in the same positions.
- the template must use a colour-coded system.
- the template must use predefined pictograms and predefined terminology.
- the information presented on the extrication card should cover the maximum safety equipment and reinforcement available in this car model even though the vehicle could have standard or optional equipment.
- only if necessary (if the locations of the reinforcements or pyrotechnic devices are different) the different body types (5 doors, 3 doors, …) will be shown on different extrication cards.

For these reasons, it was decided to define specific areas on the document for:

- a picture of the vehicle (7/8 left-hand front view).
- a key describing the colour codes and pictograms which must be used.
- a CAD drawing of the seats and seat belts.
- a CAD drawing of the car body in white.
- a table showing the vehicle's fuel type.
- a table describing the pyrotechnic equipment designed for the driver, front passenger and rear passenger occupants.

- a space for comments: for additional information that cannot be put in the reserved spaces already described, including pictures if necessary..

Traceability

In order to ensure the extrication card is the latest version, the following traceability data are required at the bottom of each page:

- Make
- Model
- Body type(s)
- Year of launch
- Internal reference
- Date of creation
- Date of update
- Version N°

Moreover, in order to control the traceability, only one PSA Peugeot Citroën department team is allowed to release the final documents and the updated documents each time its is necessary to amend an extrication card.

Accompanying documents

An instruction guide has been produced to explain what should be put in the various sections of the extrication card. This guide also shows examples for each predefined area. A table listing the latest version of each extrication card and its date of release is also available. This table is updated as soon as a new extrication card is issued or when an existing one is updated.

Extrication card layout

This template has been created so that the same card can be used for all models (irrespective of the car manufacturer). Thanks to this template, each piece of information will always be found in the same position. Figure 1 shows the key used in each extrication card.

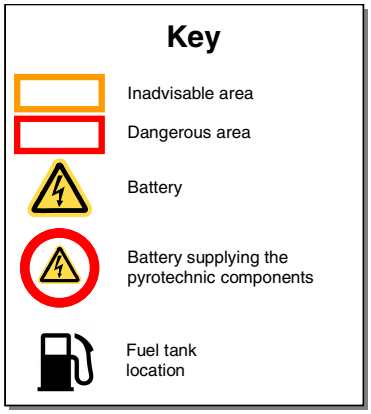

Figure 1. Key showing the colour code and the predefined pictograms that will be used for all Extrication Cards.

For the same reason, it was decided to predefine the words used to describe the safety equipment (pyrotechnics) and their possible location (see Table 1).

Table 1. - Terminology used for all extrication cards – List of options for the occupant's pyrotechnic equipment

Pyrotechnic equipment	List of choice
Front air bag	Steering wheel, Fascia, Seat belt
Side air bag	Seat Back, Seat Cushion, Door Trim Pad, Sleeper
Curtain air bag	Roof, Seat back
Knee air bag	Steering column, Fascia
Seat cushion air bag	Seat cushion
Rear impact protection	Seat back, Head restraint
Seat belt pretensioner	Inertia reel, buckle, B-pillar lower anchorage

Description of the extrication card is given in Figures 2 and 3.

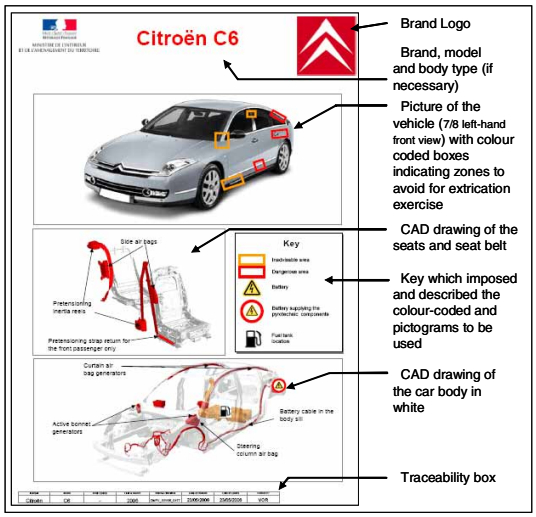

Figure 2. Explanations of the predefined areas on the 1st page of the Extrication Card.

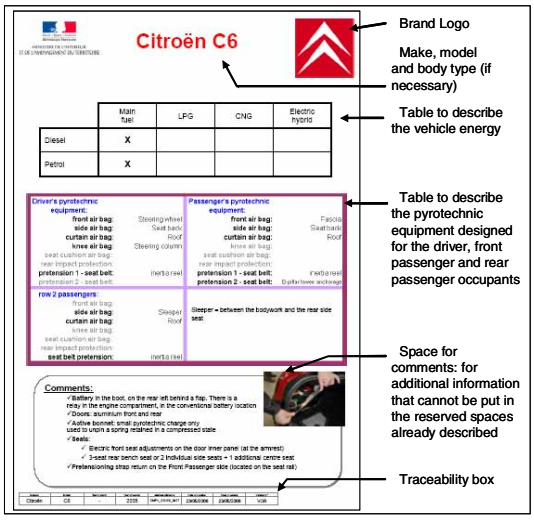

Figure 3. - Explanations of the predefined areas on the 2nd page of the Extrication Card.

Note: Larger pictures of Figure 2 and Figure 3 are presented in Annex 1.

EXTRICATION CARD: PRACTICAL ASPECT

How do we create the cards? How can we ensure that the assessment of what is an "Inadvisable area" or a "Dangerous area" is correct? To answer these questions PSA Peugeot Citroën decided to create another step in the consultation with rescue teams by presenting the new car models and their extrication cards to a leading rescue team about three months before the launch.

The first step is to create a draft version of a new Extrication Card. In this draft version, we can create yellow boxes for structural zones which we do not know if current tools will cut (see Figure 4). We also make suggestions and give advice in the "comments" space.

Figure 4. Draft version of the picture where the yellow boxes indicate the structural zones which we do not know if current tools will cut.

Then, we organize an "extrication day" with the principal rescue team. During this special day, we present the reinforcement and safety equipment of the new car model and the draft version of the extrication card. We also bring with us a crashed example of this new model.
The leading rescue team will examine the vehicle. They will carry out several extrication exercises on this car using different techniques as shown in Figure 5.
During this phase, PSA Peugeot Citroën safety experts will answer various questions and collect comments made by the team.

Following this practical exercise, to conclude this special event, a debriefing is conducted where the various zones of the structure are definitively described with the appropriate colour code and the necessary comments are put in the correct space.

Figure 5. Pictures of two different exercises carried out by the leading rescue team in order to validate the extrication card for a new model.

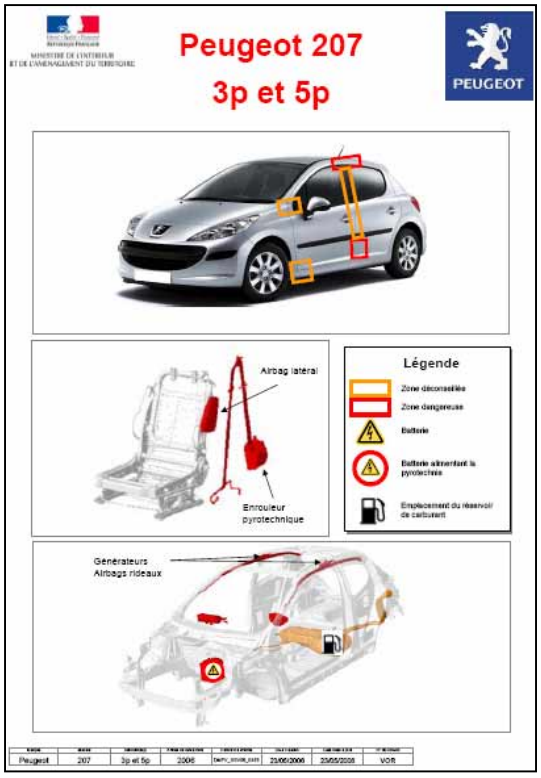

Figure 6. Final version of the Peugeot 207 extrication card (French version) where the yellow boxes have disappeared or been changed to orange boxes.

At this stage, the basic extrication card is then considered to be approved. The layout will be finalized by the engineers on their return to the design office and assigned a part number by PSA Peugeot Citroën.

PUBLICATION AND AVAILABILITY OF EXTRICATION CARDS

Campaign for France

The extrication card is then sent to the DDSC as a PDF file. When the file is received, the DDSC makes the card official for all French fire brigades by distributing it via a secure extranet site named “infosdis”.

The “infosdis” information system then generates a special message to notify each SDIS that the new card is available. It is then up to each SDIS to download this information and update its information / training system: at the moment, extrication cards are usually included in a file which is then placed in roadside assistance vehicles.

This whole procedure was completed for the first time on 26 July 2006 for extrication cards for Peugeot and Citroën vehicles on the market at that time. It has since been repeated for the launch of three new vehicles (Citroën C4 Grand Picasso and Peugeot Expert / Citroën Jumpy) as well as for updating existing cards.

Campaign for other countries

The work carried out in France has made us aware of the requirements of emergency services in all the places where new vehicles, usually with high Euro NCAP scores, are marketed. After a survey carried out with our European subsidiaries, it has become apparent that most firefighters naturally encounter the same type of extrication problems as French firefighters, since the cars are the same in most European countries. Therefore, the decision was taken to have extrication cards of French origin translated into twenty languages in order to be able to distribute them via the Peugeot and Citroën subsidiaries established in those countries. This translation work was launched at the end of 2006 and the distribution of these extrication cards through our subsidiary companies is scheduled as soon as the translated versions are validated, i.e. during the first half of 2007. It should be mentioned that the translation work will be carried out by the PSA Peugeot Citroën Group after-sales technical departments, to ensure the correct technical quality and uniformity of terminology, as soon as the extrication card has been validated by the French fire brigades. By following this procedure in future, it should be possible to make extrication cards available in several languages, as soon as new vehicles are launched in the countries concerned.

CONCLUSION

We think that this extrication card initiative is an excellent example of successful action at the level of the integrated approach that many people are currently wanting in the area of road safety in Europe. In fact, more than ever before, the continued search for improvements carried on for many years to reduce the number of those killed and injured on the world's roads now evidently depends on concerted action on the following three major factors: the driver, the vehicle and the road environment with the various players, of which the fire brigades are in the front line. Thanks to this initiative, the firefighters are also at the centre of real concerns about our new vehicle projects in which the extrication card is a deliverable like any other.

This initiative is doubly praiseworthy because it is also part of a new field for motor vehicle manufacturers, a field that we at PSA Peugeot Citroën call "tertiary safety", which aims to find solutions for dealing with the aftermath of an

accident (in our jargon, primary safety aims to prevent the accident and secondary safety aims to protect the occupants and vulnerable users in an impact). After the successful deployment of our emergency call system, designed to give information about the occurrence of an accident, extrication cards are the second practical element our Group has contributed to the field of tertiary safety.

So, we hope that French firefighters, wherever they are, in the field, at the Ministry, in schools, etc. are as satisfied as we are with what has been achieved. Extrication cards will therefore be used with enormous benefit to road accident victims and those who come to their assistance. One of the objectives cited in the recommendations in the Pourny Report has therefore been fully implemented.

RECOMMENDATIONS AND THE FUTURE

It is clear that in future the number of vehicles on the European market receiving good or very good scores in the Euro NCAP tests (at least 4 or even 5 stars) will continue to rise. It is only a matter of time before all the motor vehicles on the road are replaced: in France, 50% of vehicles on the road are replaced in just over 7 years. The problems posed by the difficulty of cutting people free from wreckage will therefore logically become greater.

Of course, firefighters will work out new intervention tactics and their tools will be improved. The important thing, during this transition period, is for them to have the basic technical information required to compensate for this growing robustness of vehicles in order not to feel like they are going backwards, powerless. With the shared knowledge on the extrication cards, the motor vehicle manufacturers can help the firefighters to keep on making progress, while we and the experts in legislation and consumerism remain conscious of the fact that, in future we must take a more global view of car accident problems, in terms of a period during the event and a period afterwards.

With all the technological progress that the car industry is currently making, we also hope that one day we shall be able to make vehicles give details of their structure and restraint equipment at the same time as sounding the alarm and providing geo-localization information after an accident, thanks to a new generation of improved emergency call. Since progress is not confined to the motor vehicle industry, we also hope that this information could be made available in real time, with extrication cards already in the rescue vehicles. The project to refurbish the French Civil Protection telecommunications system (Project Antarès), currently well under way, should one day make this possible. Then we shall achieve total integration.

ACKNOWLEDGMENTS

The authors would like to thank all those who have contributed to the success of the extrication card initiative, especially the following:

- DDSC: Philippe Deschamps, deputy assistant fire brigade manager and emergency service staff members, Colonels Sylvie Roques, Philippe Fleury and Gilles Berger, Captain Pagniez and Major Gérard Daveau;

- EDIS 91 and its representative, Major Christian Solle, as well as his "master-expert in removing victims from wrecked vehicles" colleagues from other *Zone de Défense* departments in Paris;

- BSPP and its representative, Staff Sergeant Arnaud Paindorge;

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- our colleagues at Renault;

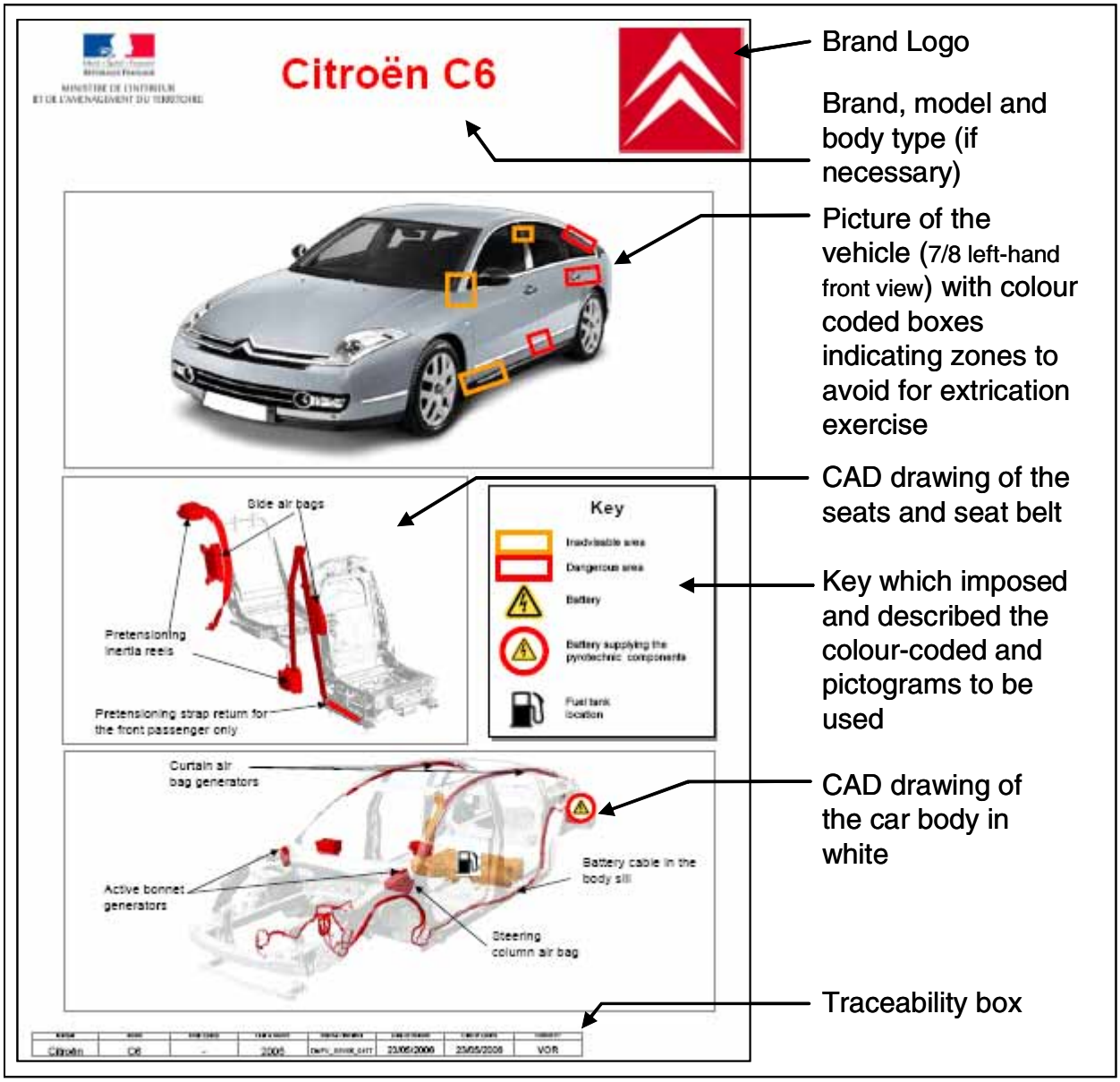
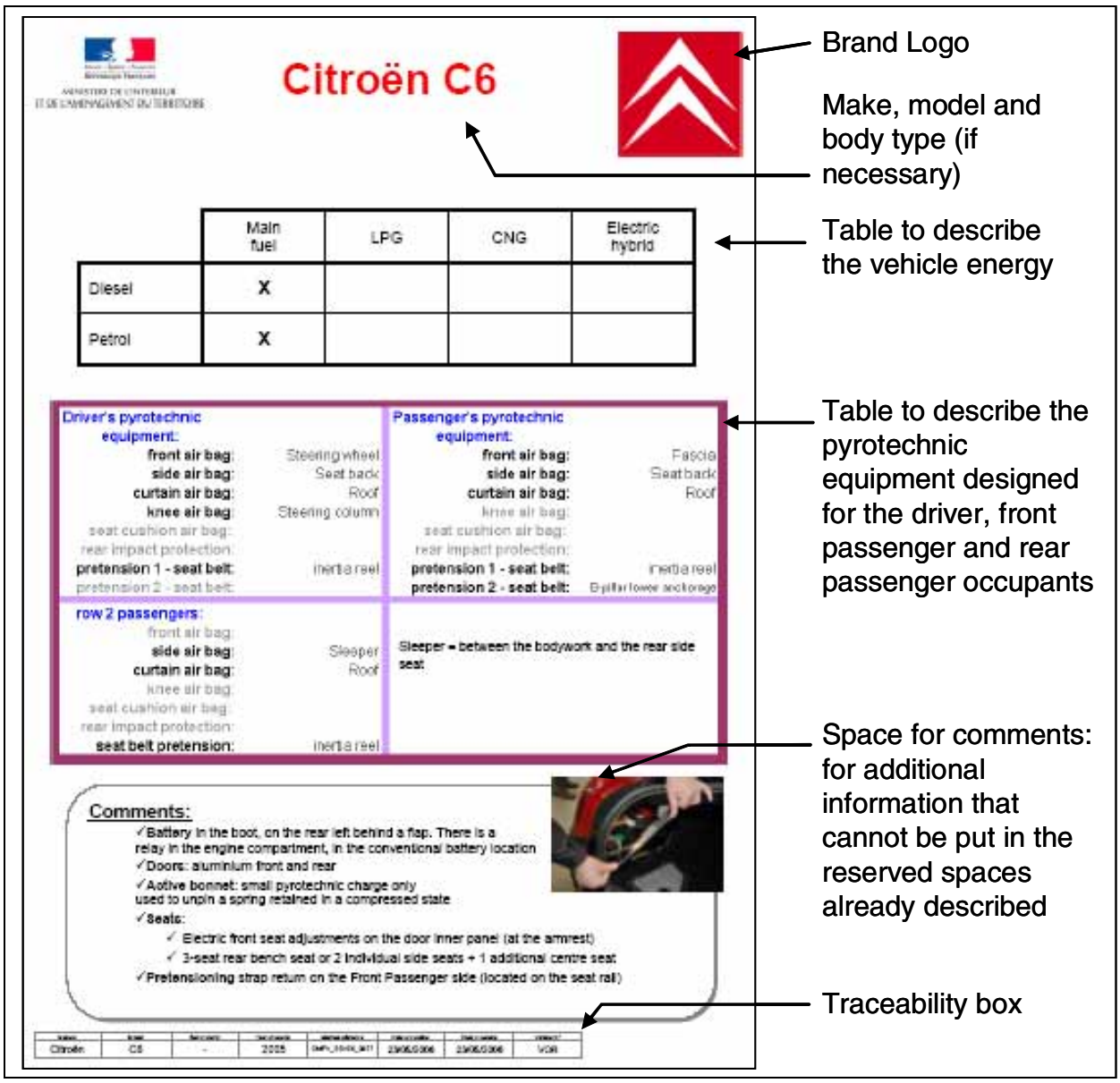
- Monsieur Philippe Sion, Chairman and Deputy Leader of the Automobile and Motorcycle Importers Employers' Federation and Robert Muller of Volkswagen Group France.

REFERENCES

[1] Pourny Report

APPENDICES

Annex 1: Detailed explanations of the predefined areas presented on the 1st page of the Extrication Card.



Annex 2: Detailed explanations of the predefined areas presented on the 2nd page of the Extrication Card.