

## Glazing renaissance at Geneva 2000



Transparent "bubble" in the Peugeot Feline 607 provides maximum all-round visibility

*Last year's glazing renaissance continued at the Geneva 2000 show with the monolithic transparent glass roof changing to two transparent lateral glass strips or an innovative "bubble" constructed in transparent plastic. These developments, as well as laminated glazing for side and back windows, aerodynamical penetration and all-round visibility, are the principal subjects discussed in this report.*

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### CONTINUATION OF TRENDS

In line with the themes of ecology and globalization at the 1999 Geneva Motor Show<sup>1</sup> and "glazing as an integral part of car evolution" at Frankfurt<sup>2</sup> and Tokyo 1999,<sup>3</sup> this investigation can be considered the continuation of the "glazing design renaissance" which really took force at the end of the last millennium. In other words, any evolution in glazing trends such as IR reflective solar control, antireflecting, antiglare, water repellent, antenna printing, switchable transmission, moulding encapsula-

tion, forming and grinding, HUD and any other future development, are all part of the "glazing renaissance" which relates to increasing the transparent area of vehicles. Furthermore, considering issues of safety, laminated side windows and rear windows can be considered one of the real challenges of special glazing in the near future.

### GLOBALIZATION AS A RECURRING THEME

Again the theme of symbiosis between all-round visibility and aerodynamical penetration was present at this year's edition of the Gene-



FIG. 1

va Motor Show with the factors of shape forming, transparent plastics and the higher impact strength of laminated glass for rear windows and side windows being areas of particular



FIG. 2

Seat Salsa 2000 (see Figure 1) whose design has clearly been influenced by VW.

**THE GLAZING RENAISSANCE CONTINUES**

The so-called "glazing renaissance", which really began with the Renault Avantime (see Figure 2) first displayed at Frankfurt last year, continued in Geneva and was again tied in with the symbiosis of all-round visibility and the concept of aerodynamical design. Two principal styles were in evidence: either an almost completely glass roof or a partially transparent roof created by using two lateral glass strips suitably



FIG. 3

- Fig. 1 - VW's influence on design is evident on the Seat Salsa
- Fig. 2 - Renault Avantime: prototype of the glazing renaissance
- Fig. 3 - Koleos by Renault with two lateral transparent strips on the roof
- Fig. 4 - Skis carried on two lateral glass strips on the Opel Zafira Snowtrekker



integrated with the windscreen and rear window in prototypes such as the Renault Koleos ( see Figure 3). In this vehicle, a huge complex windscreen extends into two glazed lateral strips along each side of the roof enabling more light to enter the car. Even the rear lights use this

interest. All of these areas can be considered market demands and end results of the increasing globalization of car makers.

As in the past two years' editions of the show, major acquisitions were taking place. In 1998 VW acquired Seat, in 1999 Mercedes bought Chrysler and this year it is the turn of Ford with Volvo, Mazda and Renault-Nissan. As a consequence, the changing geographical map of the car makers could potentially be affecting the map of the components suppliers, including the glassmakers. Now and in the near future, glassmakers are likely to develop closer, more direct contact with car designers and manufacturers. Among several examples of this feeling is the



FIG. 4

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FIG. 5

twin stage parallel opening technology. Another similar example is the Isuzu Kai SUV, which demonstrates the concept of “interwoven surfaces” where the roof contains part of the windscreen and part of the rear window which are linked by two strips of transparent glass at each side. This is an illustration of a really innovative concept of a transparent roof which is both safe and rigid. Opel’s *Zafira Snowtrekker* also has a strip of glass at each side of the roof. Here it is possible to position skis on the

two lateral strips as illustrated (see Figure 4). Each of these three examples makes clear the challenges faced by the glassmakers and the practicalities for car manufacturers of not having to produce the whole transparent roof in glass. Other models have followed the concept of all-round visibility but without using unusual transparent roofs, such as the Toyota

*Previa* (see Figure 5) and the Mitsubishi SUV (see Figure 6). The notion of all-round visibility and aerodynamics has also been approached by integrating the whole upper part of the body with a ‘bubble’ or transparent canopy which is reminiscent of an aircraft cockpit. To allow passengers into the car, the transparent panels slide horizontally and the door slides into the wings. Peugeot’s *Feline 607* (see front page) can be considered an optimum example of this. The glass



FIG. 7A



FIG. 6

Fig. 5 - All-round visibility on the Toyota Previa

Fig. 6 - Prototype Mitsubishi SUV

Fig. 7a-7b - Transparent, pre-coloured plastic glazing

used incorporates the properties of being insulating, thermal, water repellent and stratified.

Other manufacturers, such as Seat with its *Salsa* model (see Figure 1), have put more emphasis on aerodynamical penetration, and reduced the transparent area and increased the complex shape and rake angle of the glazing.

These tendencies can be considered to be the principal catalysts to the change from glass to plastic as a glazing material.



FIG. 7B

## TRANSPARENT PLASTICS

The results of the present investigation on this topic can be summarized by the following, proven concept: transparent plastics are no longer only a temporary substitute for glass in concept cars for display at exhibitions but they are starting to appear on early design applications. When various norms regarding rigidity, anti-scratching, firing, ageing, real weight and cost are clearly determined, then transparent plastic for



car glazing will very probably become a real alternative. On display at Geneva was the Fiat *Ecobasic* (see Figures 7a and 7b), which is glazed with transparent plastic, integrated with the rear lights. This prototype is an attempt to solve two of the most pressing problems of the automotive industry: producing a car that is cheap to run and cheap to build. The precoloured plastic panels elim-



inate the biggest obstacle in painting the car (one of the most costly elements in the production process). The polycarbonate, complex-shaped integrated rear window and the fixed side windows are part of the coordinating colour panels of the *Ecobasic*, which seems to be realized even in injection moulding, like the sunroof of the Toyota Celica car at Tokyo '99. Another

example of car glazing which does not use glass is the Bertone *Slim* (see Figure 8) whose upper body is made entirely out of polycarbonate and forms a canopy type shape. Again the side windows do not move up and down but in a horizontal fashion, as on the Peugeot Feline 607. Pininfarina's *Metrocubo*



Fig. 8 - Polycarbonate (PC) 'canopy' in Bertone's *Slim* prototype

Fig. 9a-9b - Complex-shaped, antiscratch coated PC windscreen (9a) and rear window (9b)

Fig. 10 - Transparent plastic has been used in a very complex, wrapping shape



FIG. 11

**Fig. 11 Stratified glass used for better impact strength on front, side window**

(see Figures 9a and 9b) is fully glazed in polycarbonate. A relaxing atmosphere is created inside the car due to the standard greyish colour of the transparent glazing and the light which enters from the blue-coloured, light filtering translucent panels on the lower part of the doors, rear window and lamella sunroof. The complex shaped, antiscratch coated PC windscreen and rear window are made by *Isoclima Aerospace*.

Lem's *Fab* (see Figure 10) is a good example of transparent plastic being used in glazing which is so complex and wrapping that glass could simply not have been used despite modern, advanced technologies for shaping glass. It appears as though designers are seriously considering using transparent plastic where no rigid parameters are involved. Glass transformer companies (not glass makers) such as Isoclima, SPS and Isoclima Aerospace can produce complex-shaped transparent plastic glazing without having to face the same costs of investment as companies who previously only manufactured glass.

### LAMINATED GLAZING

Laminated side windows and rear windows, given their better impact safety performances than tempered glasses, are likely to be in even higher demand, especially for luxury vehicles manufactured by Mercedes (see Figure 11), BMW and Audi for example. A recent investigation shows that about 30 per cent of Mercedes and BMWs already use laminated glazing on the side and rear windows and Audi on the lateral windows only. Cars using such glazing can be projected to reach more than one million in number in less than five years' time from now. Safety laminated side and rear window glazing can be used in parallel with IR reflecting glazing, especially by the metallized PET (South-wall) technology.

Laminated side windows are likely to increase considerably, due to the demand for

greater impact safety at the side of the car, which is also being met by the increasing use of lateral airbags.

### CONCLUSIONS

A brief conclusion of the Geneva Motor Show 2000 investigation seems to indicate that the current intensive globalization of car makers has not yet affected the actual marketing penetration of the glassmaker in Europe, although it will strongly affect it in the near future.

The increase of the transparent area on cars is still strongly related to the concept of all-round visibility in symbiosis with the reduction of aerodynamical penetration. This trend has already been accelerated by the "glazing renaissance" introduced by Renault with its Avantage at the Frankfurt Motor Show and now seems to be widely accepted by designers worldwide. The main difference between the Avantage and its successors is that the roof is no longer wholly transparent but consists of two lateral transparent strips.

Transparent plastic is emerging as a realistic new approach in the mind of designers, and is likely to gain even more popularity when the questions of rigidity and weight reduction have been properly solved and complex shaping becomes the main issue.

Special glazings, including the laminated side window and backlite for safety and IR reflective glazing, can be taken as a basis for increasing the influence of the glassmaker.

### REFERENCES

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3. Manfrè, G., "The main results for European glass makers in the comparison of Tokyo and Frankfurt Motor Shows '99", Internal MG Consult report.

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