

Future Trends in Vehicle Sound Package

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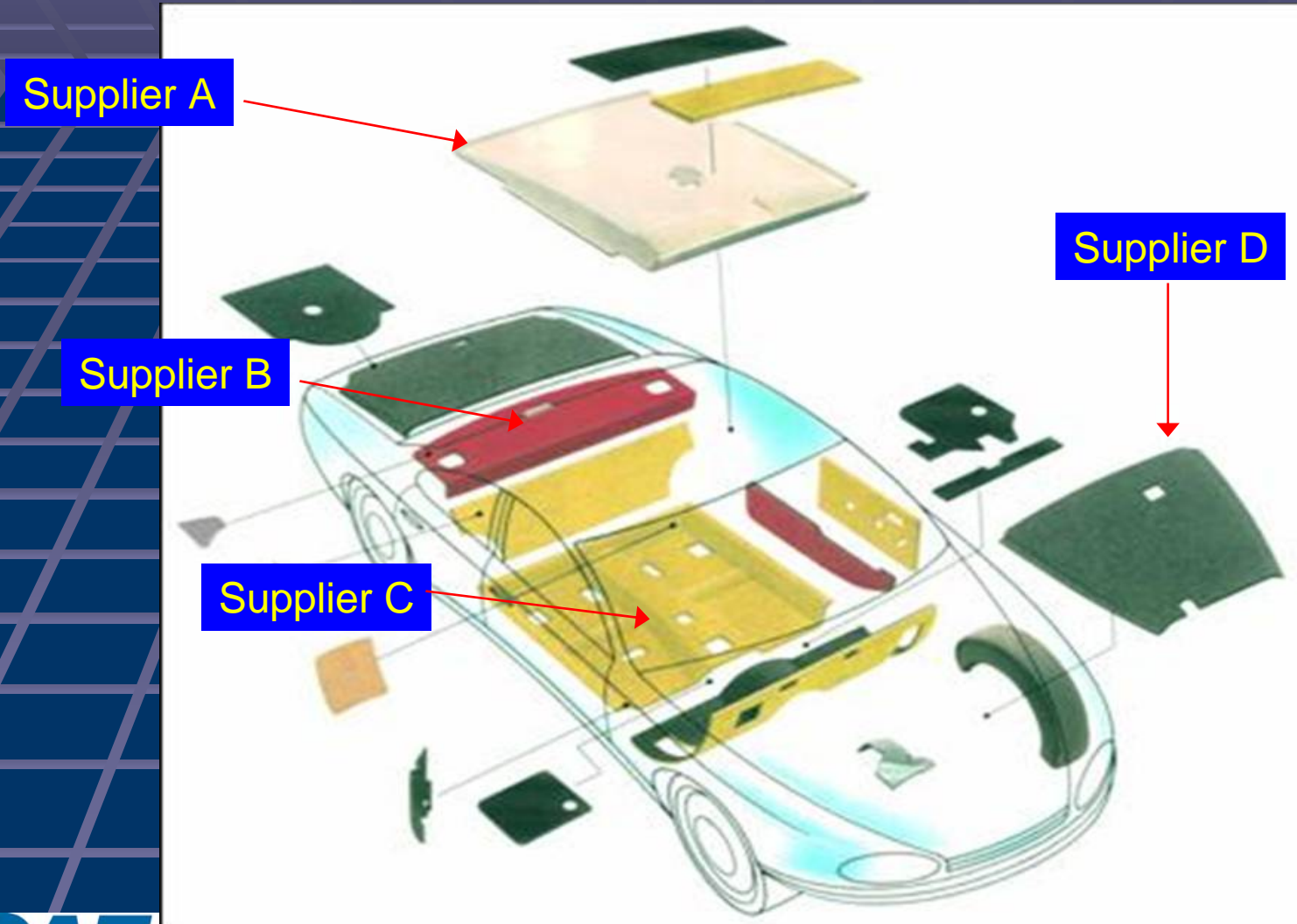
Topics

- Acoustic Integrators
- Acoustic Materials
- Emerging Technologies
- Federal Regulations

Acoustic Integrators

- While some OEM's have increased their out-sourcing for vehicle acoustic integration, some other OEM's have begun to bring this expertise back in-house.
- Component and sub-component NVH targets from the OEM's will impact engineering resources at the Tier 1 AND Tier 2 Suppliers.
- Full service supplier's capabilities will be expected in some areas, i.e. NVH testing, development, benchmarking and DV testing.
- Tier 2 supplier's will need to incorporate the above functions into their development plans in order to be competitive.

Many Suppliers will be involved within the Sound Package commodities.



Acoustic Materials

- There is constant pressure placed upon the OEM's to increase their Fuel Economy. One current strategy is to reduce the overall vehicle's weight.
- OEM's will continue to look for lightweight materials that deliver functional performance that is equal to or beyond current materials.
- Nanotechnology will play an increasing role in the future development of acoustical/lightweight materials.
- Other Noise Control technologies can also play a part in material development that are outside the traditional methods. (more on this topic later)

Acoustic Materials (cont.)

- Niche suppliers will be sought to bring new technologies into the market.
- Higher Targets AND more Acoustic Targets will be required by the OEM's
 - Absorption Coefficients (ASTM C-423)
 - Transmission Loss (SAE J-1400)
 - Specific Airflow Resistance (ASTM C-522)
 - Modified Oberst Beam Method (SAE J-1637)
- Materials made from post-consumer waste, natural or renewable sources, will be preferred along with materials that have low cost recyclability

Emerging Technologies

- Some OEM's have produced vehicles for specific markets that have used Active Noise Control technology in different applications
 - Powertrain Acoustic Noise Attenuation
 - Powertrain Vibration Attenuation
 - Powertrain Sound Quality Enhancements
- OEM's will bring to market Active Noise Control systems targeted toward the attenuation of Road and Wind Noise.
 - Computer processing time & cost will provide a better opportunity for these technologies to grow.
 - Compatability/Integration with other systems will be a must for cost, weight and function

Emerging Technologies (con't)

- Alternative Fuel Vehicles are creating a new set of material requirements not seen in the automotive industry before (Hybrid Electric, Hydrogen IC, Hydrogen Fuel Cell, Ethanol, CNG, etc.)
- CAE tools/methodologies will be heavily relied upon in developing new materials/applications with an ever decreasing supply of prototype vehicles (increase use of virtual prototypes) and decreasing development cycle times (< 30 months from KO to Job #1).

Emerging Technologies and Regulations

- Exterior Noise
 - While European markets have for long periods of time set Pass By Noise requirements for vehicles, North American markets are foreseen as adopting these methods as well for more than the now required "Class 8" vehicles.
 - Regulations pending incorporation of telematics and infotainment will have a direct impact on acoustical requirements
 - Voice Recognition either by computer (Navigational systems) or humans (On-Star[®]), will also play an important role in vehicle acoustics, especially with regard to overall interior noise levels.

Conclusions

- Acoustic Integrators will continue to be a part of the automotive design and development process. Their involvement will continue to increase as will their deliverables.
- Lightweight materials will continue to be the main thrust of new product offerings. Re-cyclability and environmentally friendly materials will have a higher focus.
- CAE will play an integral part in meeting product goals with shorter development times and decreasing prototype vehicles
- Noise Control Technology will develop further and into new areas to meet increasing customer and regulatory demands for quieter vehicles.