

Chapter 5: Market forecasts and future trends

The rail market in Europe, whether heavy, light or commuter, continues to grow to meet future transportation needs. EU forecast growth figures are suggesting that passenger numbers across all modes of rail transport will double by 2020, according to the *EU Strategic Rail Research Agenda 2020*. It is also clear that consolidation in the car building side of the industry that has taken place over the past decade has provided a stable core of manufacturing companies with established lines of supply for traditional products and services. The list in Chapter 3 of major car builders and their customers, and the list in Chapter 4 of subsystem suppliers that work with these car builders, support the fact that there are numerous opportunities for identifying future partners in the European rail market. Future forecast growth will come in a mixed format of increased capacity cars using low floors and double decks to meet the needs of new and existing corridors as well as a significant increase in vehicle technology for safety/security and passenger ride improvements.

So where are the opportunities to develop new products and partners in this ‘growth’ market? The answer really is that there are many opportunities to provide new and existing suppliers with services that can enhance the safety, security and environmentally friendliness of the rail car. If you are providing components to the fabric of the vehicle there is dedicated research underway to improve the quality and durability of these materials as well as to make them safer in the event of fire.

In information technology there are numerous areas of opportunity ranging from new directives in of on-board safety and surveillance through to passenger comfort and convenience features such as WiFi and general improvements in on-board mobile information provided to and from the rail vehicle.

According to Uwe Kucharzyk, marketing director at Bombardier’s TCMS division in Berlin, which includes its new Sekurflo CCTV division, “More than 50% of new vehicles that Bombardier produces are fitted with CCTV and advanced passenger information systems. In LRVs it is in excess of 60%.” Passenger-based WiFi and wireless services are also on the increase in operators’ requirements according to Kucharzyk. This has given Sekurflo some challenges for future railcar wiring designs.

HVAC technology is improving its efficiency to provide better heating and cooling while becoming greener in terms of energy efficiency as well as making use of more acceptable coolants. Door technologies are providing advanced features to enable more efficient use of space for the mechanisms as well as ensuring that safety of closure remains a priority. Lighting systems are moving more towards the use of electrically efficient LED technology where possible and research in this area is finding new ways to increase the output of these devices for more widespread use, giving rail vehicles enabling increased reliability.

Interior materials and fabrics are more robust than previous products, with the added benefit of being non-hazard and low-smoke for added safety in the event of fire. These advances further reduce the cost of ownership of rail car interiors and enable intervals between seat refurbishments to be increased. Laminates are increasingly being used where once only metal surfaces were used. The interior of rail vehicles is now on a par with aircraft interiors and a high degree of commonality can be seen in the various materials and technologies. Indeed a number of new entrants to the laminates and materials markets are also supplying the aviation and marine cruise industries, allowing greater economies of scale to be achieved.

In flooring technology, heating and ventilating systems are moving from inside the car to exterior positions and enter the

car via integrated heating circuits buried within the floor as well as well as through ducts at both floor level and head height.

In the short term most growth can be found in the development of new greenfield LRV networks. Existing operators of commuter and metro systems, however, are also buying and refurbishing cars at a significant rate and opportunities are arising in many new contracts for the use of new interiors and replacement of older technologies to ensure that vehicles are made as safe and efficient as possible. Replacement rates for new car builds in heavy rail and commuter rail markets by existing operators are currently running at a ratio of approximately 1:1. That stated, it is in the area of LRVs that increased growth in rail vehicles is occurring and where opportunities for new suppliers to introduce new interiors technology and systems are available.

Most of these new networks are potentially being funded from EU government funds at some level with the odd public-private partnership (PPP) also being introduced. Medium-term opportunities lie in the improvement of commuter corridors to increase capacity and schedules through more frequent and higher-capacity trains. As can be seen in Chapter 6, specific areas of future research are being focused on these areas to facilitate increased capacity by using safer, greener and more environmentally friendly rail vehicles. A further area of interest to new suppliers offering novel interior systems and features will be in the small but growing area of automated people movers. Many airports now use these light trams on dedicated rights of way. Component system suppliers should ensure that they are also monitoring the aviation and amusement park sectors for projects in this area.

Vehicles that are currently ‘in build’ feature in the table below. Many of these will be incorporating the latest interiors technologies. Some will have interiors that have been planned throughout by an award-winning designer specifically for a given corridor or network identity. An example of this would be the new metros used in Athens recently for the Olympics. The trend for ‘designer’ interiors is increasing and while not every operator is turning to its local college of art, they are ensuring that coordinated interiors are becoming more common.

Below is a listing of recent car builder’s orders that have been publicly notified for major European networks. There will also be orders that the main OEMs have chosen not to make public.

LRVs

| OEM | Location | Number of LRVs |
|-------------------|-------------------|----------------------|
| Bombardier | Köln | 69 |
| Bombardier | Dockland (London) | 55 |
| Alstom | Barcelona | 37 |
| Alstom | Grenoble | 45 |
| Alstom | Lyon | 10 |
| Alstom | Valenciennes | 21 (low-floor trams) |
| Siemens | *Unspecified | 100 |
| Total | | 337 |

Metro vehicles

| OEM | Location | Numbers of Metro vehicles |
|-------------------------|--------------------|-------------------------------|
| Bombardier | London Underground | 1,738 (deliveries 2008-2015) |
| Bombardier/Breda | Madrid | 790 |
| Alstom | Paris Metro | 800 |
| Siemens | *Unspecified | 800 |
| Total | | 4128 |

Heavy rail (HR) vehicles

| OEM | Location | Number of HR Vehicles |
|---------------------|-------------------------------|-----------------------|
| Breda | Norway | 36 |
| Wagon Fabrik | Aachen | 11 DMUs |
| Siemens | LHR (London Heathrow airport) | 4 |
| Total | | 51 |

High-speed commuter rail vehicles

| OEM | Location | Number of CR Vehicles |
|-------------------|-------------|-------------------------|
| Bombardier | Spain | 16 (TGV-style vehicles) |
| Siemens | Spain | 16 (TGV-style vehicles) |
| Breda | Italy | 30 (locomotives) |
| Breda | France | 12 EMUs |
| Alstom | Netherlands | 96 (TGVs) |
| Total | | 170 |

Total rail passenger vehicles on order in Europe (notified)

| OEM | Vehicles |
|---------------------|----------|
| Bombardier | 2,273 |
| Alstom | 1,009 |
| Breda | 473 |
| Siemens | 20 |
| Wagon Fabrik | 11 |
| Total | 4,686 |

*Not all manufacturers advised on specific orders and some figures have been approximated from information provided.

The addition of new features will always be a function of meeting customers (operators) requirements while taking into account new and beneficial practices for more economical production methods as well as complying with any new legislation. The formation of the new EU-wide rail authority will see some of these aspects come to bear in the near term. Opportunities to provide HVAC, doors, AVL, materials, lighting and new flooring will all be encompassed in a combination of interior designs and operational and construction/production requirements.

Component supply opportunities in the major groups reviewed in this report will be influenced by new areas of research, as briefly mentioned above. Some of these areas of research and systems improvement are listed in Chapter 6. It should also be appreciated that as the research matures into systems that are being deployed, then these systems will be used to develop new standards and methods of operation affecting not only car builders but the subsystem suppliers in various areas. According to Bombardier Transportation’s annual report, increasing use of outsourcing will feature in future strategies as well as considerations for environmentally friendlier systems.

An example of this is the need to find more environmentally friendly coolants for AC systems. Increasing numbers of AC systems are being specified to meet the demand for sealed rail vehicles using controlled environments. These new HVAC systems are more efficient and environmentally cleaner than older systems, and help conserve heat and improve operational costs as well as passenger comfort. Further opportunities appearing over the past few years are in the area of communications, surveillance and monitoring systems within

rail vehicles, where there has been an explosion in use. Rail telematics is a major area of research for European companies and also a major opportunity for non-rail companies to enter the market. Increasing use of systems intelligence to assist in train diagnostics is on the increase and operators are now including more self-diagnostic systems able to operate over train-based Ethernet networks. The increase in the use of Ethernet (100baseTX) systems has also caused the IEEE to add Ethernet to the list of preferred train line networks.

A further area of opportunity is in the provision of custom interior designs, features and furnishings. Many of the companies listed under ‘miscellaneous’ are part of this growing business area. Increasing use of specialist design houses to enhance car interiors can now be seen and these designers are improving the quality and functionality of rail car interiors, providing a new opportunity for systems furniture and fittings as well as the use of quality materials where appropriate.

From research undertaken for this report, as well as publicly available data, it is clear that within Europe the main car builders are Alstom (France), Bombardier (Germany/Canada) and Siemens (Germany). These companies have significant influence across all modes of rail vehicle within the industry and their current rankings appear in the following table.

| OEM | European revenue 2006 | Personnel |
|-------------------|-----------------------|-----------|
| Alstom | Euro 5,300 million | 25,000 |
| Bombardier | Euro 3,330 million | 21,550 |
| Siemens | Euro 4,502 million | 16,650 |

Source: Alstom, Bombardier and Siemens annual reports for FY 2005/2006