

RAIL VEHICLE MAINTENANCE – GLOBAL TRENDS IN THE AFTER-SALES MARKET

Markets - Trends - Players

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SCI Verkehr's MultiClient Study "Rail Vehicle Maintenance – Global Trends in the After-Sales Market" offers a comprehensive insight into the structure, volumes and development trends in the After-Sales market for rolling stock.

The After-Sales market makes up one half of the total railway vehicle market but is developing less volatile than the OEM market, with similar growth rates in the medium term. The After-Sales market is therefore of very high importantce for the players in the market. Expenditures on maintenace of rolling stock represent an important cost factor in the life cycle of railway vehicles. Efficiency increases are therefore often an important factor regarding the strategic orientation of railway operators. Awarding of maintenance services to external partners is a development resulting from this. The After-Sales market therefore offers medium- to long-term growth prospects for manufacturers and independent suppliers of maintenance services in particular.

In view of this, all companies in the rail industry are greatly interested in obtaining reliable market information on the After-Sales segment.

With this MultiClient Study, entitled "Rail Vehicle Maintenance – Global Trends in the After-Sales Market", SCI Verkehr GmbH addresses this demand and provides core data relevant to competition for market volumes as well as current and future trends in this segment. This study is a continuous further development of the successful previous study from 2012, including advanced data basis, new evaluations and assumptions for maintenance costs and latest market forecasts. All chapters of the preceding study have been re-evaluated and revised entirely.

In concrete terms, this market study of rail vehicle maintenance contains:

- An overview of the worldwide After-Sales market differentiated by region, including an in-depth analysis of the most important country markets
- Analysis of the market volume in the global maintenance markets
- Analysis of operators and vehicle fleets in the various regions
- Detailed presentation of market structures and market organisations
- Identification of key players in the maintenance sector
- Identification and evaluation of future trends
- Company portraits for the top players in the After-Sales market
- Presentation of important current maintenance and refurbishment projects

The English version of the MultiClient Study "Rail Vehicle Maintenance – Global Trends in the After-Sales Markete" is available fom September 2014 at the price of EUR 3,300 + VAT (PDF-Version).

Contact: SCI Verkehr GmbH Ann Kathrin Arntz Tel: +49 221 9317820

E-Mail: a.arntz@sci.de

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Extract from the Study

3 The Market for Vehicle Maintenance in Western Europe

3.1 Market Overview

Profile: Western Europe						
	Market volume 2013					
	After-Sales	EUR XX XXX million				
	Light maintenance	EUR X XXX million				
	Heavy maintenance	EUR X XXX million				
and the same	Refurbishment	EUR X XXX million				
3	New vehicles	EUR X XXX million				
	Market development 2013-2018					
. 13	After-Sales	X.X%				
	New vehicles	X.X%				

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With a market volume of EUR XX XXX million, the After-Sales market in Western Europe is the largest regional market world-wide, ranking above Asia. The Western European market is determined by a multitude of industrial nations with relatively well-developed and advanced transport infrastructures and railway systems including state-of-the-art railway vehicles. The railway system has experienced a revitalisation in the highly industrialised countries of Western Europe in the last two decades. Examples are various HSR projects in France, Germany, Italy, Spain or the UK as well as extensive new developments in urban rail transport. The harmonisation of railways in Europe and the deregulation and privatisation of railway operation are together making progress.

Western Europe: Market volume of After-Sales services by country and transport mode 2013 [in EUR million]

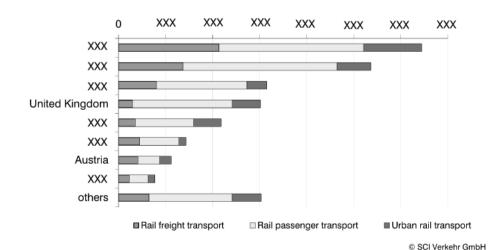


Figure 14: Western Europe: Market volume After-Sales top countries 2013 [EUR million]

More then the half of the market volume is allocated to passenger rail transport and one sixth to urban rail transport systems. With a combined share of alost XX % of the total volume in Western Europe, XXX and XXX are by far the most important countries for After-Sales services.

The highest market volumes are recorded in the XXX and XXX segments. The After-Sales market for XXX will continue to see above-average growth as the increasing demand in transport capacities in Western Europe cannot be met only by the procurement of new vehicles; older vehicles must therefore remain in operation beyond their original lifetime.

[...]

The total After-Sales volume will furthermore slightly increase in the next few years, mainly driven by increasing technological requirements in the vehicle maintenance (e.g. modern XXX or XXX with higher average speeds than in recent years, as well as communication and information technology) ongoing refurbishment and modernisation projects as well as the price development for maintenance services. The named reasons will more than compensate for the declining number of vehicles in some vehicle segments (e.g. XXX, XXX, XXX).

Western Europe: After-Sales services							
Vehicle segment	Current market volume After-Sales service p.a. (in EUR millions)	Average market development 2013–2018 (in % p.a.)	Volatility of market development 2013–2018 (in % total)				
E-Loco	1 400	+1.9	0.1				
D-Loco	XXX	XXX	XXX				
HSR	XXX	XXX	XXX				
EMU	XXX	XXX	XXX				
DMU	XXX	XXX	XXX				
PC	XXX	XXX	XXX				
FW	XXX	XXX	XXX				
LRV	XXX	XXX	XXX				
Metro	XXX	XXX	XXX				
Total	XXX	XXX	XXX				

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The strategy of the most companies owning XXX has focused on the procurement of new vehicles in the last few years. In contrast, the volume for refurbishment and modernisation projects of XXX has risen due to the increasing demand from private train operating companies for additional used vehicles as well as the demand for refurbished vehicles within their existing fleets.

Western Europe: Market volume of After-Sales services by vehicle segment and maintenance level 2013 [in EUR million]

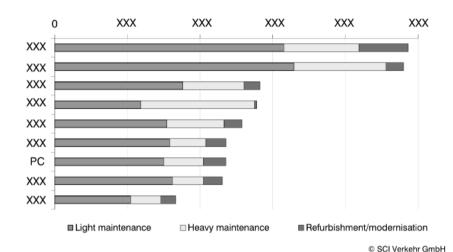


Figure 25: Western Europe: Comparison of market volume for After-Sales per vehicle segment 2013 [EUR millions]

3.2 Transport Companies

Despite the ongoing deregulation in railway transport in Europe, most of the transport performance is still accounted for by the incumbents in their respective domestic markets. Exceptions are the passenger transport markets in the UK and Sweden, where transport services are predominantly awarded as rail franchises through competitive tendering. In terms of transport performance, the three most important operators in Western Europe are XXX, XXX and the XXX which collectively account for more than 40 % of the transport performance in Western European passenger rail transport and all still control their domestic markets.

[...]

3.3 Installed Base

A fifth of the worldwide fleet of XXX is in operation in Western Europe. XXX is the most important country, accommodating around 25% of the Western European fleet, followed by XXX, XXX and Switzerland. The large procurement wave in the last decade has led to a significant drop of the average age. The fleet of diesel locomotives outnumbers the fleet of XXX but its share in the worldwide installed base is considerably lower, at less than 10%. The largest fleets can be found in XXX, France and XXX. Due to the high number of relatively old stock, SCI Verkehr expects a slight decline in fleet sizes.

Western Europe (still) has the world's largest fleet of HSTs, but within the next five years Asia will be the most important world market region. Nonetheless, the fleet is growing continuously due to constant deliveries. Railway companies in France, XXX, XXX, XXX, and the UK have made extensive procurements or have procurement plans in place. In XXX (XXX) and the UK (Hitachi Super Express Train) large-scale programmes are under way to replace more than 100 outdated HST.

The Western European passenger coach fleet comprises of XXX vehicles, which still represents almost 15% of the worldwide fleet. The number of passenger coaches will continue to drop significantly and faster than any other world market region, as these are being replaced by modern multiple units in regional services and HSTs in long-distance transport. XXX has the largest national fleet in Western Europe, followed by XXX and France.

Western Europe: Installed base and development							
Vehicle segment	Installed base 2013 (units)	Average age (years)	Installed base development 2013–2018 (in % p.a.)				
E-locos	XXX	XXX	XXX				
D-locos	XXX	XXX	XXX				
HST	XXX	XXX	XXX				
EMU	XXX	XXX	XXX				
DMU	7 300	18	+0.8				
PC	XXX	XXX	XXX				
FW	XXX	XXX	XXX				
LRV	XXX	XXX	XXX				
Metro (cars)	XXX	XXX	XXX				

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[...]

3.4. Market Structure and Organisation

3.4.1 Passenger rail transport

In most Western European countries, the maintenance market for passenger rail vehicles still remains in the hands of operators. The former state railways normally have extensive workshop capacities for maintaining their fleets. Individual workshops specialise in certain vehicle segments.

At XXX, major inspections, accident repairs and vehicle refurbishments are generally carried out separately from light maintenance by the heavy maintenance subsidiary XXX. The company maintains railway vehicles on behalf of its parent company XXX and in addition offers maintenance services to external customers. The various divisions (XXX) have their own network of workshops and service centres for light maintenance.

Beside a dense network of sites for light maintenance, French incumbent SNCF also has workshops which specialise in major repairs and vehicle overhauls, refurbishments and modernisations. SNCF has carried out refurbishment projects for its TGV fleet, e.g. in the works in Bischheim (Strasbourg), Romilly (Aube) and Hellemmes (Lille). The company also offers services and capacities to other operators in Europe through the subsidiary SNCF Masteris.

Western Europe: Market shares of companies for vehicle maintenance in passenger rail transport [total ~ EUR X XXX million - partly estimated]

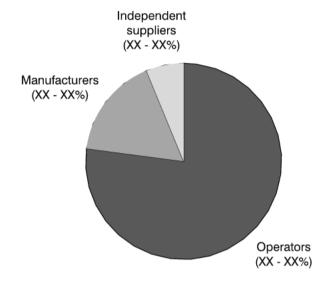


Figure 27: Western Europe: Market shares of companies in the total After-Sales market for passenger rail transport 2013 [in %]

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In the UK, the manufacturers, in particular Alstom, XXX and XXX, possess a great deal of influence. The companies have comprehensive contracts with various operators for the maintenance of vehicles operated for the different franchises. Most of the workshops are owned by XXX, but increasing numbers are being constructed and operated by other

players, such as operators or manufacturers. In some cases, new depots will be financed by the operators and leased to the subcontracted manufacturer.

3.4.2. Rail freight transport

The large rail freight companies such as XXX, Rail Cargo Austria (Austria), XXX, XXX and XXX carry out light maintenance of their large fleets themselves and have comprehensive maintenance networks specially adapted to the maintenance of freight wagons and locomotives. In contrast, the Swedish carrier Green Cargo has contracted major parts of the rail freight vehicle maintenance to manufacturers or independent suppliers.

Western Europe: Market shares of companies for vehicle maintenance in rail freight transport [total ~ EUR X XXX million - partly estimated]

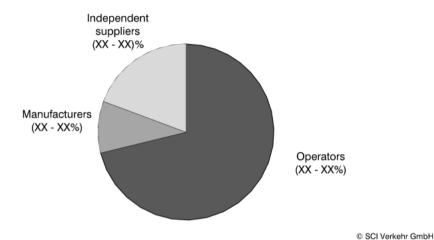


Figure 38: Western Europe: Market shares of companies in the total After-Sales market for rail freight transport 2013 [in %]

Leasing companies own a significant proportion of the vehicle fleets available in Western Europe. As most of these companies do not have own workshop capacities, the vehicles are maintained by contract partners. The partner workshops have been selected on the basis of their location, establishing a European workshop network.

3.5. Companies in the Maintenance Segment

The market situation in the individual Western European countries varies considerably. While the majority of operators in Austria, France, XXX, XXX or XXX have their own maintenance workshops, manufacturers are responsible for all kinds of vehicle maintenance services in Spain (in joint ventures with the state railway RENFE) and especially in the UK In Sweden, the company EuroMaint, which emerged from the privatisation of the Swedish state railway, is responsible for the maintenance services on behalf of many operators. EuroMaint is also the largest independent maintenance service provider in Europe.

The following factsheets provide a short overview of the most important vehicle maintenance companies currently active in Western Europe:

Alstom Transpor	* ALSTOM
Headquarters	Saint-Ouen (France)
Description	Leading rolling stock manufacturer with worldwide activities and long market tradition in Western Europe
	- Most important After-Sales markets in Western Europe are France, Spain, Italy and the UK (including major maintenance contracts for HSTs in all named countries)
	Offers all types of maintenance services (short-range maintenance, long-term full-service contracts, major and minor repairs, revisions and inspections, refurbishment and modernisation projects)
	- Joint venture Irvia with Spanish incumbent RENFE for the maintenance of HSTs
Important vehicle segments maintained	- HST - DMU - EMU - LRV
Important maintenance services (selection)	Verkehrsverbund Mittelsachsen (EMU), contract ends 2032 Tramlink Nottingham (LRV), contract ends 2033 London Underground, Jubilee Line (metro), contract ends 2017 []

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DB Fahrzeuginstandhaltung DB						
Headquarters	Frankfurt/Main (Germany)					
Description	 Founded in 2001 through outsourcing of DB's heavy maintenance workshops Maintenance supplier within the business division DB Dienstleistungen and thus a subsidiary of the German incumbent DB Portfolio includes all kinds of maintenance services for almost all railway vehicles, but focus on heavy maintenance and modernisation projects; operating divisions of DB have their own maintenance networks for light maintenance and some minor repair services 					
Important vehicle segments maintained	- E-Loco - D-Loco - HST - EMU - DMU - PC - FW					
Important maintenance services (selection)	 Most of the maintenance services are organised in-house for rail vehicles of parent company DB; no individual projects published Most important published projects for external customers: Contracts with Abellio and WestfalenBahn covering general inspection of 36 EMUs as well as heavy maintenance services, contract end unreported [] Veolia Verkehr (DMU), contract ends 2020 					

Euromaint Rail	EuroMaint
Headquarters	Solna (Sweden)
Description	2001: Privatisation of the maintenance division of the former state railway SJ; Euromaint and Swemaint (later taken over by Finnish freight manufacturer Kockum) were the resulting companies
	- []
Important vehicle	- E-Loco
segments maintained	- D-Loco
	- DMU
	- EMU
	- PC
	- FW
Important maintenance	- Tagkompaniet (EMU), contract ends 2024
services	- []
	Focus on repair and modernisation / refurbishment projects:
	- SJ 2000 repower and refurbishment as sub-contractor for ABB Switzerland
	- []

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3.6. Important current maintenance and refurbishment / modernisation projects

3.6.1. Full-service contracts

Wester	Western Europe: Important current full-service contracts							
Coun try	Seg- ment	Maintenance provider	Number [units]	Time period	Contract volume [EUR million]	Remarks		
DE	EMU	xxx	29	2016 - 2032	n/a	Alstom was awarded a EUR XXX million contract to supply XX XXX to Verkehrsverbund Mittelsachsen GmbH (VMS) in Central Saxony, Germany and a servicing contract over a period of 16 years. The first contract includes purchase options for up to XXX additional trains. The trains are scheduled to enter commercial service in June 2016 on the XXX II electric network.		
UK	D- Loco	EMDL	xxx	2013- 2023	n/a	In 2012, UK based company EMDL (subsidiary of Chicago-based locomotive manufacturer EMD) has signed a ten-year contract with XXX to maintain its fleet of XXX locomotives. This is the company's first full-service maintenance contract. The vehicle maintenance service will be carried out the new Doncaster workshops.		
ΙΤ	HSR	Alstom	25	XXX- XXX	xxx	XXX ordered a total of 25 XXX HSTs from Alstom, costing around EUR XXX illion. The contract has a value of EUR XXX billion and includes maintenance of the vehicles at the new site in Nola for XXX years.		

3.6.2 Modernisation / Overhaul / Refurbishment

Wester	Western Europe: Important current modernisation / overhaul / refurbishment projects							
Coun try	Seg- ment	Maintenance provider	Number [units]	Time period	Contract volume [EUR million]	Remarks		
UK	EMU	Railcare AB (Knorr- Bremse)	XXX	2013- 2015	XXX	Eversholt Rail awareded Railcare a two-year contract worth GBP XXX million to undertake C6X overhauils of 40 Class 365 Networker fourcar EMUs in service on First Capital Connect.		
DE	EMU	DB Fahrzeugin- standhaltung	xxx	XXX- XXX	xxx	DB Regio Hessen is investing EUR XXX million in the modernisation of XXX ET 423 EMUs up to 2015. The vehicles will receive new window panels and interiors, new passenger information and security siystems as well as an adaption of the vehicles for better accesebility for persons with reduced mobility. The work is being carried out by DB Fahrzeuginstandhaltung at the Krefeld site.		
DE	Metro	XXX	182 (cars)	2012- 2019	78	A total of 91 large-profile double railcars of the F74, F76 and F79 series belonging to the Berlin transport authority (BVG) are undergoing comprehensive refurbishment from 2012 to 2019. They will be given a new microprocessor drive control for the camshaft gear, a new static inverter for the DC 110 V on-board power system, a new heating control and a new door control as a replacement for the existing programmable logic control (PLC) for which replacement parts are no longer available. In addition, Vossloh Kiepe is responsible for the renewal of the pneumatic system by a subcontractor.		

3.7. Trends and Prospects

The market for maintenance services in Western Europe has not yet been fully deregulated; there is still not yet non-discriminatory access to all available workshops. In consequence, the large maintenance divisions of the incumbents have advantages in the competition due to their size. Euromaint is still the only major independent provider in Western Europe. The state railways generally face increasing financial difficulties within their maintenance divisions. The main reasons are an increasing cost pressure (e.g. increasing competition with manufacturers) and existing overcapacities driven by shrinking fleet sizes. [...]

Due to the outstanding importance of the Western European market, as the world market region with the highest After-Sales volume, the global manufacturers Alstom, Bombardier and Siemens have an especially high interest in gaining market shares. This is particularly true of full-service maintenance contracts including the realisation of the total value chain. [...]

Exceptions to the typical market structure include the After-Sales markets for railway vehicles in XXX, XXX and the XXX, where the manufacturers have for years been fully or partly responsible for maintenance and will continue to be.

3.10. Country-specific market conditions United Kingdom (UK)

Market environment/Transport market

Since the gradual dissolution of the former state railway British Rail between 1994 and 1997, passenger rail transport in the UK has been reorganised into regional franchises and performed by private Train Operating Companies (TOC). The franchise contracts are awarded via exclusive tendering procedures so that both domestic and foreign transport companies have the opportunity of operating trains in the UK. In addition, the operation of trains based on an open-access basis is possible, even though the proportion of transport performance is very low. Besides the largest operators XXX, Govia (joint venture between Go-Ahead Group and Kéolis), XXX, XXX and XXX, foreign operators include DB (DE, via its subsidiary Arriva UK), XXX, and MTR Corporation (CN). As consequence of the takeover of Arriva by DB, the German incumbent has become one of the top three passenger rail transport operators in the UK. The three main competitors in the British rail freight market are DB Schenker Rail UK, Freightliner and GB Railfreight, with a combined market share of 90%.

[...]

Segmentation of the After-Sales volume

The UK ranks second in terms of the largest fleets of HSTs in Western Europe, with around XXX trains. In consequence this vehicle segments generates the highest After-Sales market volume, followed by XXX. Both train types are similar to eacht other and differ mainly in their top speed. Aside from the Eurostar line, a total of eight railway franchises feature HSTs, most of them in service on conventional railway lines. Regular services running at top speeds of at least 200 km/h have been in operation since the late 1970s, most of the lines are capable of speeds of up to 225 km/h. The major operators XXX, XXX, XXX, XXX and XXX all operate HSsT, most of them of the model InterCity 225, followed by Pendolino trains.

With more than X XXX trains, the third largest XXX fleet is in operation in the UK, all of them of a unique design typical for the country due to its special clearance gauge. In addition, British operators rely on a fleet of appr. X XXX DMU, which are considerably shorter than the electric trains. The five largest operators account for nearly half of the fleet.

The UK generates the highest After-Sales volume in themetro segment in Western Europe, which comes almost entirely from the large metro system in London comprising a total fleet of X XXX metro cars, making it the largest metro system in Western Europe.

United Kindgom: Market volume of after-sales services by vehicle segment and maintenance level 2013 [in EUR million]

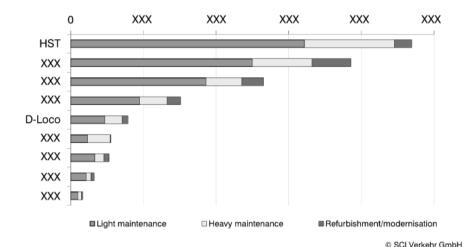


Figure 41: United Kingdom: Comparison market volume After-Sales per vehicle segment 2013 [EUR millions]

[...]

Market structure/Maintenance providers

The British maintenance market is predominantly in the hands of the three major systems houses Alstom, Bombardier and Siemens. These maintain the fleets in depots owned by XXX as well as in their own major workshops specialised in heavy maintenance services and vehicle refurbishments. The operators or vehicle owners often sign long-term maintenance contracts with the manufacturers, which determine the minimum service life of the vehicles. In terms of vehicle procurements, the vehicle leasing companies are also pursuing a strategy to sign long-term maintenance contracts with the manufacturers.

The British After-Sales market is traditionally characterised by a significant number of independent maintenance companies. Some of them have been taken over by larger players in the past few years, e.g. London and North Western Railway Co. Ltd (LNWR) had a network of five maintenance workshops and was acquired by XXX in 2008 and maintains since then the trains of XXX; the rail vehicle component and overhaul activities of Railcare was acquired by Knorr-Bremse in the second half of 2013. Despite the ongoing consolidation of the British After-Sales market, a remarkable number of independent suppliers are still offering maintenance services. The most important independent company is XXX with a major workshop in XXX and two more sites in XXX and XXX since the takeover of XXX. Other independent players include Arlington Fleet Services, XXX, XXX or XXX.

[...]

Trends and prospects

SCI Verkehr expects no major changes to the current market structure in the next few years. The manufacturers will further increase their market presence with the market entry of Hitachi as part of the XXX consortium (70% XXX, 30% XXX). The Japanese manufacturer will construct XXX HSR cars to replace outdated XXX trains and will also be responsible for the vehicle maintenance of the fleet over a period of XX years. The consortium is therefore constructing new depots in XXX, XXX and XXX. [...]

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Please fax to: + 49 (221) 931 78-78 or email to: a.arntz@sci.de

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Hamburg Office

SCI Verkehr GmbH Schanzenstraße 117 20357 Hamburg

Phone: 49 (0) 40 5071970 Fax: 49 (0) 40 50719720

Cologne Office

SCI Verkehr GmbH Vor den Siebenburgen 2 50676 Köln

Phone: 49 (0) 221 931780 Fax: 49 (0) 221 9317878

Berlin Office

SCI Verkehr GmbH Köpenicker Strasse 48/49 Eingang G 10179 Berlin

Tel.: 49 (0) 30 2844540 Fax: 49 (0) 30 28445420 E-Mail: info@sci.de www.sci.de

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