

Maintenance of small and mixed fleets

# The Principle of Partnership

After the liberalisation of the rail market, a large number of private railways have been able to establish themselves on the market. These new companies have relatively small vehicle fleets with a comparatively wide range of vehicle types, and their operational locations are widely dispersed. This places increased demand on the cost-effectiveness of maintenance.

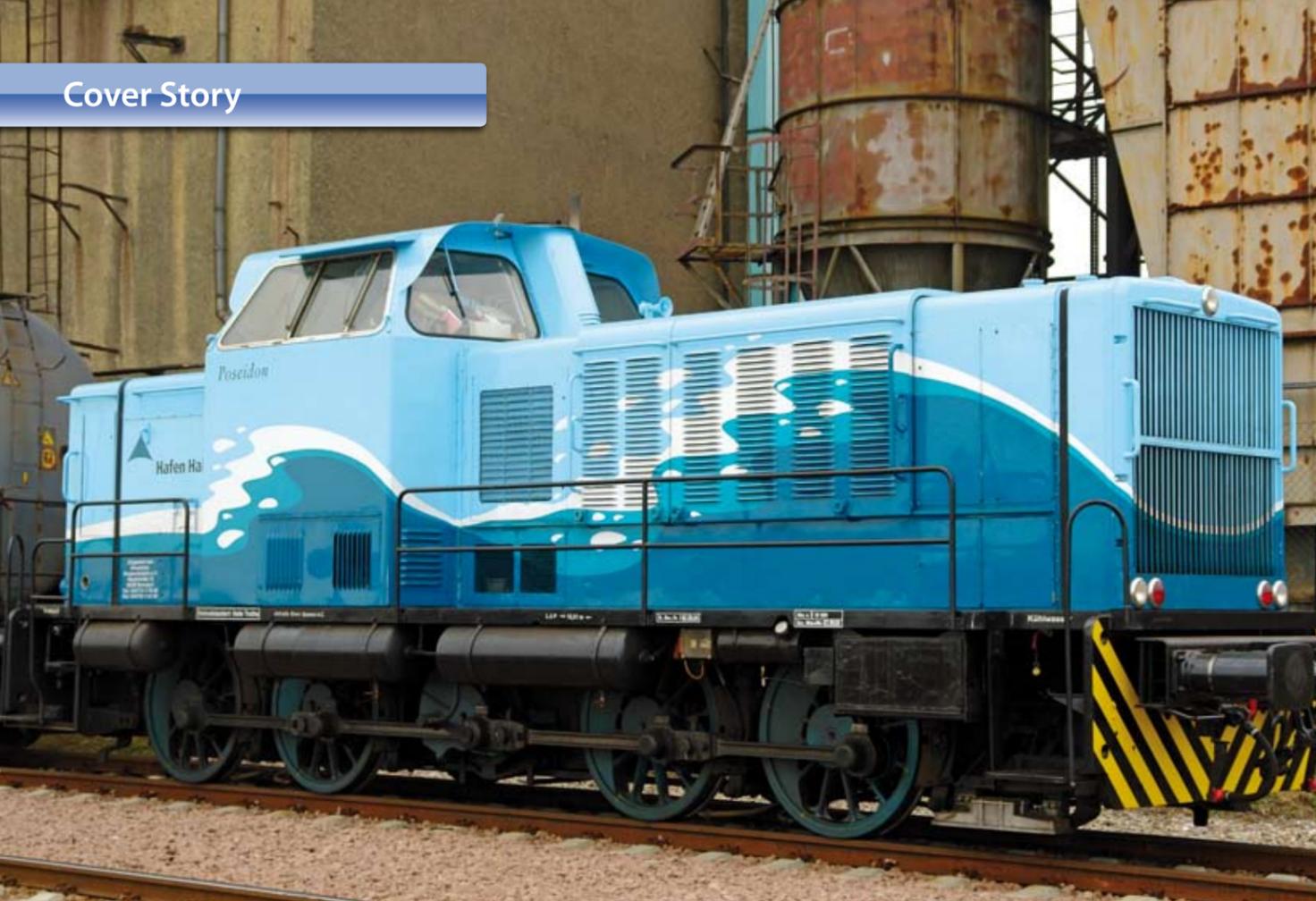
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There has always been a conflict of interest in vehicle procurement: on one hand, homogeneous fleets are desirable in order to spread development and approval costs over a large number of vehicles. On the other hand, requirements made on the vehicles are highly varied. The all-in-one solution does not exist, and so-called universal vehicles are often a complex and costly solution. On top of this, universality is often limited, and for this reason many rail companies end up preferring vehicle types with features that match specific requirements. This conflict of interest – vehicles according to requirements or a homogeneous fleet – affects vehicle maintenance in the same way. Especially spare parts inventories and training of personnel are cost drivers for mixed fleets. In addition to these general problems, there are peculiarities in the individual transport modes to be taken into consideration.

## Regional freight transport

A small private market was already present in freight transport before the railway reform. Accordingly, in this segment of the small and medium-sized performance category, the product range and service of the manufacturers are already developed. Therefore, used spare parts can be profited from increasingly often, and trained technical staff can also be found. Requirements for the existing fleet are very common and similar. In general, diesel locomotives of up to 1200 kW that meet no special requirements are used, which means that it is quite easy to find spare parts when performing major maintenance tasks. The operational area of the vehicles is very limited, so maintenance can be performed at a fixed location. The size of the fleet is usually critical in this market segment. While DB alone housed about 70 locomotives of the class V 100 at its train depot in the 1980s, there are private operators today who only own a single locomotive. This means that there is no way to operate a train depot cost-

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Individual trains as well as small and mixed vehicle fleets require intelligent maintenance concepts.

effectively and maintenance largely has to be outsourced. The consequences are dependencies and costly empty runs.

#### Passenger transport

Challenges are considerably larger in some cases with respect to passenger transport. Vehicle requirements are defined very clearly by transport authorities, so there is little room for vehicle selection, or possibly the latter has even been already defined by transport authorities. Requirements of availability and reliability are generally higher in passenger transport than in freight, and the number of vehicles kept in reserve has to be minimised in order to remain competitive. For small fleets, this results in some lines being operated entirely without reserve vehicles. Accordingly, preventive maintenance must take place during operation breaks or off-peak times, when not all vehicles are required. This, in turn, makes it hard to use third-party maintenance infrastructure at other locations, because the trips there would take up too

much time; hence, even the smallest fleets have a train depot. Operation of the Hunsrückbahn, which runs a train depot for only three vehicles, can be called upon as an example for this situation. Stadlers RS1, expanded with a steep track package, run here. All three vehicles are required simultaneously for school transport. There is no reserve vehicle, as it would mean a 25 percent reserve and would therefore not be economically viable. Equivalent or only similar replacement vehicles that could be rented from other companies if necessary do not exist. This means that perfect preventive maintenance is necessary here to ensure an availability of almost 100 percent. Accordingly, spare parts for eventual corrective maintenance must be held in stock in order to avoid service failures due to delivery times.

#### Long-distance haulage

Problems are again different in long-distance haulage. On one hand, there is the problem of strongly mixed fleets: For example, MWB uses more

than a dozen types with a total fleet of around 50 locomotives, including small engines. On the other hand, usage is extremely scattered, making central maintenance difficult. While this problem can be solved by means of flexible workshop partners at operation start and end points, the quality control of the maintenance work carried out represents a problem. Professional execution of the work is essential, especially in long-distance hauling, since service failures due to track clearing, spare locomotives, empty runs and so on very quickly lead to high economic burdens. If maintenance is performed at different locations by different partners, the results are often mutual recriminations, making it difficult to determine who is responsible, so the costs have to be borne mostly by the operator.

#### Maintenance in cross-border traffic

Another challenge is the maintenance of locomotives used in cross-border traffic. The real challenge in this case is not so much the maintenance of the

locomotives but rather taking care of all the different train control systems. A locomotive travelling from the seaports of Antwerp and Rotterdam to Germany has to have at least four train control systems: Belgian TBL (crocodile), Dutch ATB and ECTS, Level 2, for the Betuwe route and German PZB. In addition, LZB (continuous automatic train control) has to be included in the system on busy routes, and if Germany is only a transit country, still further train control systems are necessary. Besides there are often strict regulations under which workshops have to be certified in order to be allowed to perform maintenance on locomotives and wagons operating in the respective countries. With a large fleet, the specific cost is low, whereas for small fleets it is hardly feasible economically, so the dependence on third parties continues to grow. To avoid this problem, a large number of lease or rental contracts include maintenance.

An alternative is cooperation with railways from the respective countries, so that they take over trains at the border. This way, cross-border locomotives become entirely unnecessary. The problem in this case is the increased cost incurred by traction changes and also long waiting times in the case of late handing over.



The partnership principle can be very interesting for smaller workshops.

#### A possible approach to a solution: the partnership principle

Principally, strategic partnerships, whether in maintenance or in traffic management, are an essential foundation for success, and this applies



Even specialised vehicles such as track-laying machines can benefit from pooling solutions in spare parts.

even more the smaller the railway undertaking (RU) is. In this sense, there are several different possibilities to establish partnerships.

#### Pooled stock of spare parts

In other industries, such as energy production, partnerships and pooling solutions in spare parts management have long been a proven way to shorten downtimes and simultaneously keep an efficient spare parts inventory. Generally speaking, this is applicable if the acquisition of a replacement for a failed part which is indispensable for a system because of high failure costs takes a long time and having it in stock implies relatively high costs or ties up capital. In a power plant this means basic parts such as generator shafts or in the railway sector, power packs, traction bogies, etc. A repair or new purchase may take several months, and depending on the workload of the supplier, even up to one year. If there are several undertakings operating vehicles with the same components, they can build up a common pool of spare parts, thus increasing the availability of their fleet in a cost-effective way.

#### Maintenance partners

Similarly, partnerships are a good way to optimise maintenance. In this way, train depots of partner companies can maintain each other's locomotives operating on tracks that do

not run close to their actual home depot, allowing the performance of fast corrective maintenance and of preventive maintenance at the same time without empty runs. This reduces costs and increases locomotive availability.

#### Communal depots

The principle of partnership can be pursued indefinitely. For example, several partners can jointly build a new depot at a central location, available to everyone according to their participation. Conurbations such as the Ruhr or the Rhine-Main areas are particularly useful for this, allowing high investment costs associated with constructing and equipping a new plant to be shared. At the same time, a high level of utilisation of the depot is guaranteed due to the many operators, resulting in a decrease in specific on-going costs.

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