Searching for further potential for improvements is still high on the agenda for the network operators, even after developing and implementing various maintenance strategies to achieve the highest possible standards of track quality whilst, at the same time, reducing costs.

One essential element of a successful maintenance strategy is the use of modern track-maintenance machines (Fig. 1), harmonized in size and output, deployed in all-in maintenance systems so as to achieve the best possible quality of work and thus lasting cost savings. Servicing and regular maintenance of these machines, as well as timely exchange and replacement of those parts that are subject to high wear, make it possible to achieve the goals set for availability, output, savings and better quality.

In addition to all this, the consistent incorporation of further developments and new wearing materials as they become available makes it possible to leverage considerable savings potential along with a higher output and a better quality of work. The following examples serve to illustrate these latest developments:

- higher-quality tamping machines, thanks to the use of tungsten-carbide-plated tamping tines and conversion to centre-tool tamping units,
- versatile use of tamping machines, thanks to the application of the CAL laser system in curves,
- better use of existing resources, thanks to the addition of the automatic belt control for MFS material conveyor and hopper units,
- increased work output of track-maintenance machines, thanks to the use of new wear-resistant materials, such as tungsten-carbide edges for the roller runways of conveyor belts, and flexible machine operation, thanks to the use of exchangeable units, such as interchangeable ploughs for ballast-distribution and profiling machines.

These longer and much-improved life cycles are possible thanks to a special design: all-round armour plating with tungsten-carbide plates over the entire area of the tamping tine, which is mainly subject to wear in the ballast bed. The underside of the tine separates the ballast bed as it penetrates it, the tine plate transmits the squeeze forces to compact the sleeper bed, and the rear side of the tine is subject to heavy wear from the ballast when the tines penetrate it and when they are opened again after the squeeze action. For this reason, all the following parts are armour-plated with brazed tungsten-carbide plates:

Fig. 1: The 09-3X Dynamic Tamping Express track-maintenance machine

The new Plasser tungsten-carbide-plated tamping tine (Fig. 2) is used as a "year-long tine". In other words, tines last for a whole construction season, without additional time being necessary to exchange them. Using these new tamping tines (outer tines) on the 09-3X Tamping Express in Germany, it has been possible to achieve more than 890,000 tine insertions up until now. The tungsten-carbide-plated tamping tines for point tamping machines have also proven their reliability in terms of durability and longevity.

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Fig. 2: The new Plasser tungsten-carbide-plated tamping tine

Optimized deployment of track-maintenance machines thanks to the use of high-quality wearing parts

Maintenance work on railway tracks constitutes an important factor in upholding the high quality of the network. It ensures the availability of the track and a high quality standard. Achieving these targets for the lowest possible cost is the challenge facing the network operators [1].
Optimized deployment of track-maintenance machines thanks to the use of high-quality wearing parts

the penetration edge
the tine plate
the conical-shape rear side of the tine,
and
the side surfaces (with brazed,
tungsten-carbide inserts).

Service life has a fundamental influence
on the rate of return on investment. Economic-efficiency calculations are
influenced decisively by high output per metre. The long service life of the
tungsten-carbide-plated tine assures a
consistent quality of tamping with reduced
costs for material and the labour required
for replacing tines.

The two-sleeper tamping machine with
centre-tool units makes a further
contribution to the durable tamping of
sleepers. This machine features a new
configuration of tamping tines (Fig. 3).
As already tested on the three-sleeper
tamping machines, only straight tines are
installed. Together with the slim design, it has proved possible to reduce the
penetration area and to extend the
squeeze path at the same time. The tine
compacting surfaces and thus the sleeper seat have been enlarged by about 15%.
This considerably improves the durability
of the sleeper seat. The lower penetration resistance means that penetration time is
shorter, and this increases the working speed (Fig. 4). The higher service life
of the tamping tines on centre-tool
units has a visible impact on reducing
regular maintenance costs. It is thus
recommended to convert to centre-tool
technology when the tamping units are in
the workshop for a scheduled overhaul
anyway. In addition to this, the specialists
in the repair technology department of
Deutsche Plasser, Munich, are able to
offer fast and accurate conversion of
Duomatic tamping units at any time.

Versatile options
thanks to the use of the CAL
laser system in curves

Since 1995, a combined longitudinal level and alignment laser for straight track has
been used to guide Plasser & Theurer tamping machines. This enables
simultaneous measurement of longitudinal level and alignment faults using a dot-
shaped laser beam, which is aimed at a laser receiver camera. Using this combined
system, the machine can either be guided
directly according to the laser beam or it can perform a measuring run prior to
maintenance work and calculate correction values from this. The Win-ALC automatic
guiding computer is used to record the
measured data. The correction data
calculated by the Win-ALC can then be
used to guide the tamping machine. A
measuring run using the combined longitudinal level and alignment laser has
produced good results particularly on
points and crossings.

All the functions of lasers used on straight track are now available for work in curves
too. Work can be performed on all known types of track geometry using the CAL
curve laser system (Fig. 5). The laser
receiver camera is located on the tamping machine’s front tensioning trolley. It tracks
the laser beam vertically and horizontally.
The correction values for longitudinal level
and alignment are calculated from the
difference between the measured position
and the target position, which is
established by Win-ALC. These correction
values are used for the automatic
guidance of the tamping machine’s lifting
unit to keep it aligned with the target track
gridometry.

The curve laser is used primarily in track renewal for the first tamping passes and

Fig. 3: Reduced penetration resistance thanks to centre-tool technology

Fig. 4: Centre-tool two-sleeper tamping unit on an operating 09-32 CSM
Optimized deployment of track-maintenance machines thanks to the use of high-quality wearing parts

for secondary lines. Another option is to use the curve laser, as before, in points and crossings. Now the laser can also be used for the turnout track and for curved points.

Retrofitting the CAL curve laser system onto tamper machines can be done by Technical Customer Service personnel on the customer’s premises or at one of Deutsche Plasser’s repair bases (Leverkusen, Hanau, Leipzig, Freilassing) and will substantially extend the range of application of the machines.

Automatic belt control for MFS units

Material and machine logistics are becoming an increasing challenge, particularly on large-scale worksites. If the entire transport of material to and from the site is to use only the track under repair, with the work being performed by high-capacity ballast-cleaning machines or machines for formation rehabilitation, it is necessary to deploy a large number of MFS material conveyor and hopper units in support. To be able to make even more efficient use of these units in future, an automatic belt control has been developed for the fast and controlled loading and unloading of the hoppers. Laser sensors are positioned in the front and rear area of the hopper and monitor and control the filling process. This ensures that the hopper unit is filled evenly. When the loading limit is reached, the laser control switches the transfer to the next MFS unit. The automatic belt control makes it possible for the operating personnel to concentrate on other tasks. Moreover, the available storage capacities are fully used, and this reduces the need for additional units. Retrofitting existing MFS units is possible at any time, but the Technical Customer Service at Deutsche Plasser ought to be consulted first.

New wear-resistant materials – tungsten-carbide edges for the roller runways of conveyor belts

The economic use of track-maintenance machines and vehicles depends on their availability at the required time. This means continuous monitoring of the servicing and repair of all components, especially those subject to high wear during working operation. Research into new wear-resistant materials and testing under operating conditions are opening up new fields of application. Precision manufacturing according to original Plasser & Theurer drawings ensures fast and easy installation in situ. Additionally, the flexible production method makes it possible to implement engineering requirements with precision.

The use of new tungsten-carbide edges for the roller runways of conveyor belts (Fig. 7), like those used on material...
Use of replacement units

On the profiling and shoulder ploughs (Fig. 9) of ballast-distribution and profiling machines, the movement of ballast causes high material wear. To increase the service life of these machine parts, wear-resistant tungsten-carbide edges are now being used in the area of the profiling plough and on the edge of the movable front plate. The special quality of the tungsten carbide, the size of which is chosen according to its operating position, results in a tenfold increase in service life compared with conventional wearing materials.

In many cases, it is not even necessary to dismantle a component for repair, thanks to the easily exchangeable tungsten-carbide elements. In this way, these new tungsten-carbide wearing edges reduce the amount of maintenance work needed on the machines and bring considerable savings in costs. In addition to conversion to these modern wearing materials in the ballast plough sector, Deutsche Plasser offers the use of leased or replacement equipment. Not only complete shoulder ploughs but also centre ploughs are available for ballast ploughs. While the units are being reconditioned or retrofitted, work can continue using the replacement ploughs. This service provides a cost-efficient option to avoid wasted working shifts.

Apart from all this, Deutsche Plasser is able to supply a tamping unit, recording unit, ALC automatic guiding computer, longitudinal level and alignment laser and the like, at any time.

Concluding summary

Quality of work and output as well as the labour costs related to them are decisive factors for maintenance strategies. Thanks to the use of modern machine systems, the best way to meet these requirements is through retrofitting and optimizing the existing machine fleet as well as the far-sighted use of high-quality original spare parts and wearing parts. This ensures a high availability of the machines required and, consequently, shorter total track possessions. This contributes to the success of the individual construction projects and also to the success of the railway system as a whole.

Reference


DC/DC Converters
High Voltage-Converters
AC/DC-Supplies
Sine Wave Inverters

19”-Cassettes for railway-, ships- and vehicle-applications

General:
* Nominal input voltages: 12/24/36/48/72/110/220 V DC
* EN50121 / EN50155
* Temperature range: -40°...+65°C

RAB-series 30 / 60 Watt
KM-series 50 - 60 Watt
* KM U/B with front input
* 10ms active hold-up time
* 3 HE IGBT

FTE-series 80 - 100 Watt
* Fast build up: 3HE IGBT
* Unipolar, bipolar
* Output switchable

HL-series 100 - 300 Watt
* 3 power classes 100/150/200W

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