

The URM 700-2: a multi-talented ballast cleaning machine for plain track and turnouts

Turnout installations on modern high-capacity and high-speed railway lines consist of concrete sleepers, sensitive drive and control systems, and heavy rail profiles. The maintenance of these costly track components must be conducted with the utmost care and precision, and in a cost-efficient manner, whereby track closures are kept to a minimum, especially on main lines. The Plasser & Theurer URM 700-2 offers fast, safe and high-quality ballast cleaning of turnouts.

URM 700-2: continuous-action ballast bed cleaning of turnouts

The multi-talented URM 700-2 allows ballast cleaning of turnouts to be carried out in a single pass, without the need to remove and re-install the turnout, thus allowing a continuous work progress. This is made possible by the ingenious machine design concept of the URM 700-2, in that its:

— *shoulder ballast excavation unit*, which – being located towards the front of the machine – makes it possible to fully work through a turnout in a single pass without having to reverse the machine. In fact, the URM 700-2 can work through turnouts from both sides – a clear advantage if several turnouts have to be cleaned one after another. Also, if the clearance gauge of the track under repair allows, the straight track between two turnouts can even be worked by using the shoulder ballast excavation units on either side of the machine (all work units are doubly configured).

The shoulder ballast excavation unit excavates the shoulder ballast on the free side of the track and transfers it to the ballast screening unit. The free space thus created allows the slewable ballast excavation chain to be easily inserted underneath the track panel – no track panel dismantling or access hole digging is required;



- *scraper conveyor system*, which – being located in the shoulder area next to the ballast excavation chain – enables soiled ballast to be picked up and conveyed to the ballast screening unit in a continuous manner, thus without any interruptions. In this manner, no material heap-ups occur that could jeopardise the delivery geometry of the turnout following work;
- *safe and careful handling of heavy concrete-sleepered turnouts* – achieved by the adoption of three lifting units that lift the through track of the turnout, and a number of additional ones that lift the diverging track, all featuring telescopic beams – ensures a good distribution of the lifting forces during work;
- *optimum re-ballasting capability* – re-ballasting of the turnout track panel with cleaned ballast takes place directly behind the main ballast excavation unit, using two slewable conveyor belts – ensures that an even re-ballasting is achieved and, thus, delivery geometry of the turnout;
- *large 15 m³ on-board ballast storage hopper* – that can hold a large amount of cleaned ballast before it is returned to the track – makes interim storage of recycled ballast in a MFS unit obsolete;

- *powerful machine drive system* – the URM 700-2 has its own drive unit (two diesel engines with a total output of 1,100 kW), as well as four powered axles – also allows it to travel over short distances at a maximum speed of 19 km/h without having to be hauled by a locomotive. Further, the ballast screening car features its own drive unit for operating the screens;
- *dust arresting atomiser* – a water-spraying system – suppresses the spreading of dust, which reduces environmental pollution;
- *secure work spaces and cabins* – the URM 700-2 features secure work spaces and cabins in the shoulder excavation area, as well as the main excavation area (the latter featuring, amongst others, the lifting units with clamps and hooks, the ballast excavation chain, as well as the two slewable conveyor belts that are used for re-ballasting) – provide a safe working environment for the work crew.

URM 700-2 offers continuous-action ballast bed cleaning of turnouts [Ref.]

The machine operating design concept offers various benefits, as the URM 700-2:

- allows non-stop cleaning of the ballast bed of turnouts, as no dismantling of the turnout or digging of an access hole is needed, let alone any cutting of the rails at the beginning or welding at the end of the work;
- can fully work through a turnout in a single pass without having to reverse the machine, due to its shoulder ballast excavation unit being positioned towards the front of the machine;
- requires only short set-up times which, together with shorter time windows needed for ballast bed cleaning, leads to significant time and, thus, cost savings.
- allows a large proportion of cleaned ballast to be returned to the track, due to the high-quality cleaning of the soiled ballast material by the high-capacity ballast screening unit and, thus, less new ballast is needed – this results in cost savings, as well as a reduced environmental impact;
- can operate without infringing the clearance gauge of the adjacent track, as the supply and transfer of all the ballast material take place on the track under repair – traffic on the adjacent track can continue without disruption.

The URM 700-2 is very much suited for cleaning ballast of large turnouts with movable point frogs of high-capacity and high-speed lines, as well as for performing track shoulder cleaning and ballast cleaning of short sections of track (spot maintenance). Following ballast cleaning, the track can be tamped immediately, thus ensuring an optimal delivery geometry of the turnout. Both ballast cleaning and tamping can be performed without any disruption to traffic on the adjacent track, and upon completion of the work, the track can immediately be opened to traffic – exactly what railway administrations require when having to manage tight schedules for turnout maintenance.

Reference

Wörgötter H., Zuzic M., Waldhör N.: 'Faster ballast bed cleaning of turnouts by means of the URM 700-2', Rail Engineering International, Edition 2018, Number 2, pp. 7-9.