

Technical Specifications Multi-purpose Gantry MPG



100 – Main points – Features of project :

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|----------------------------|-----------------------|
| - Tunnel : | One tube |
| - Inside tunnel diameter : | 8 m |
| - Maxi slope of tunnel : | 3,5% |
| - Maxi bank : | 150mm (between rails) |
| - Considered work length : | 1 km |
| - Temperatures : | -15°C to +45°C |
| - Minimum radius : | 300m |
| - Rolling surface : | specific bottom |

The multi-purpose gantry, named MPG, is a self-propelled gantry, rolling on tunnel bottom sides. It spans the invert segments aimed to receive the traffic rails and its sleepers, or concrete beams that are casted on site.

In case of stations, it is aimed to run on a dedicated mode where it rolls at the same time on the tunnel bottom and on the station platform. This specific mode will be detailed further.

It is brought on a standard wagon to the job area, and will suit the traffic gauge W6. When it arrives to the job, the MPG folds up its legs (wheel support) and will come to rolling area. The operator adjusts the job height, positions the MPG and selects one of the rolling modes.

The MPG is able to transport on the job area using its tools:

- Rails
- Sleepers
- Concrete
- Iron frameworks
- Miscellaneous loads

200 – Technical features of MPG

- Maxi load transported	14 000 daN
- Empty weight	25 000 daN
- Traction capacity at slow speed :	7T@3km/h including 3,5% slope
- Overall length	27,25 m
- Overall width	2m
- Overall height	2,95 m
- Number of wheels	8
- Tyres dimensions	355/45-15 (Full Rubber tired)
- Number of motorized wheels	8
- Number of wheels with dynamic brake	8
- Number of wheels with static brake	8
- Independent suspensions :	8
- Number of steering wheels :	8
- Turning radius	60 m (To be confirmed)
- Speed, loaded on 3.5% upward slope	8 km/h
- Speed loaded on flat bottom	10 km/h
- Coverable slope (Empty) :	10 %
- Diesel engine	110 kW
- Working range	12 to 16 hours
- Consumption :	between 25 and 35 L/h (indicative data)



MPG defined for Crossrail jobsite is equipped with specific following devices:

CATERPILLAR C4.4 Engine, latest generation corresponding to the last pollution standards (**Stage 4 final**) It is serial equipped with particles filter with regeneration system. It is self-cleaning (**no cartridge to be cleaned**).

Adapted kinematics. METALLIANCE develops in the field of this project a multi wheels articulated kinematic device that permit to roll on different track heights. So, the self-driving gantry can work in a normal section without disassembly (rolling on bottom on each side of gantry), or within a section of « station » type (rolling on bottom or on station platform). Transition can be made continuously without stopping the transfer using a ramp, or in a non-continuous way (covering a step by sequential moving of MPG).

Automatic Guidance System : METALLIANCE uses in this project its AGS (automatic Guidance system patent **FR 1352192**) to assure gantry transfer in guided automatic mode : MPG is equipped with 4 ultrasound sensors positioned on each side of gantry, which measure its position in relation to the segment. The steering system of gantry and the AGS device guarantee the side positioning of the MPG.



Tools

Rail traction arm:

Rail traction arm tool is equipped with rail pliers. It is composed of an arm mounted on a free articulation, transversally free. The tool set is fixed to the chassis support by "twist lock". It is equipped with lifting points to assure its installation using hydraulic winches.

Traction capacity: 7T

Can be use with a thimble to place correctly the rails.

Sleepers layer:

Tool is fixed to the chassis tool support using twist locks. It is equipped with lifting points to assure its setting up using hydraulic winches.

MPG has 2 types of bar spreaders for sleepers lifting:

Type S3

Number of sleepers: 30

Spacing: 650mm

Prehension arms with hydraulic control assure blocking or release of crossbeams. An adjustable telescoping device comes and position crossbeams at the wished space.

Universal spreader 12T Capacity
18m rail+ HAS panel

Agitating hopper « SECATOL »:

Conditions of operating:

- Water capacity : 5m³ (reduced capacity to the max use load for heavy concrete, i.e. 3 m³)
- grading <30mm
- slump (Subsidence height) : 7cm

The tool is fixed to the chassis tool support using twist locks. It is equipped with lifting rings to assure its setting up using hydraulic winches.

340 – Material transport platform:

The 10T capacity material transport platform is aimed to receive different loads such as:

- Iron framework
- Mould
- Templates
- Accessories

It is equipped with balustrades and access ladders. It receives 4 seats for personal transport in the middle of the platform

The tool is fixed to the tool support chassis using twist locks. It is equipped with lifting points to assure its setting up using hydraulic winches.