TRF LIMITED
A TATA Enterprise

Wagon Tippler with Side Arm Charger

TECHNICAL SPECIFICATIONS

- Capacity : Gross weight of loaded wagon 140 T (Max)
- No. of Tips : 25 Tips per hour
- Clamping : Hydraulic
- Duties : Continuous
- Drive : Electro-Mechanical/Hydro-Mechanical/Hydraulic
- Design : Incorporates all features provided in RDSO33 (Revision-1) guidelines.

Wagon Tippler

The state-of-the-art wagon tipplers manufactured by TRF are in accordance with the Indian standards and the prescribed norms laid down by the statutory bodies.

The wagon tippler is designed to unload materials like Coal, Coke, Lignite, Iron Ore, Limestone, dolomite etc. from the open type railway wagons viz; BOY,BOX,BOXN ,BOXNHA, BOXNHL, BOXN25, DFC25, DFC32.5 MKD-11 I OZ/0 etc. It is also capable of performing the function of weighing the gross & tare weight of wagons by incorporating an integral weighbridge. TRFs wagon tipplers are of sturdy construction and require negligible maintenance.

The tippler is of latest design having incorporated all the main feature mentioned in the RDSO G 33 (Rev.-1) guidelines. The Wagon Tippler with End Rings and reinforced shafts is supported on trunnion bearings. Moveable side support fitted with side beam is so designed that it has a facility of forward/backward movement, such that it should be able to move & touch the different width of wagon without applying any pressure on the wagon side wall. The top clamping arrangement will facilitate proper clamping of different height and width of wagons. The wagon is clamped automatically on the table during tippling and no hand adjustments are necessary. A wide range of wagons can be accommodated and the clamping arrangements are such that it is firmly held without damage or undue pressure on any part of the wagon. The machine is capable of automatically clamping (by hydraulic clamping) and tipping specified 8-wheeler bogie type broad gauge open wagons. The tippler empties wagons above rail level and inverts them through a maximum angle of 160 degrees so as to discharge the material into the hopper.

The tippler is a positive gear operated hydraulic driven machine of massive and robust construction and designed for continuous and arduous duty. It is counter balanced at each stage of its operation. It carries the wagon with pin jointed connections between the component, thus giving an articulated construction. The sector gear is mounted on the periphery of end rings and driven by pinion mounted on shaft powered by gear box and motor or by direct hydraulic drive.

The Wheel Gripper and Wheel Choker ensure that during wagon tippling no inadvertent motion of the wagons occurs and no accidental rolling of the wagons is possible on the tippler table.

Working Description :

The loaded wagon to be discharged is placed to the central position on the tippler cradle and is weighed with Weigh Bridge (If installed).

At rest position of the Wagon Tippler the Movable side support moves forwards and touches the side wall of the wagon gently and gets locked

At the start of rotation of the end rings the rail platform with loaded wagon lifts from its supports and as a result of the offset pivot, the wagon adjusted slightly and rests against the longitudinal movable side beam. The rotation continues and the wagon is swung towards the top copings of wagon.

The tippler is driven by a Hydraulic motor and the top-clamping device is actuated by four hydraulic cylinders mounted on the End Ring. Cylinders are operated by a hydraulic power pack, which gives necessary fluid flow, and pressure to operate the cylinders.

During the tippling operation, Top clamping device starts moving to clamp the wagon from top. At 40 (approx) of the wagon rotation, top clamp comes in contact with the wagon's top coping. At this condition cylinders get locked, in turn wagon is securely held between cradle platform and top clamp pads. Rotation continues up to 160and material starts to discharge at 40 (approx) and continues up to 160. In the process of discharge, the cylinder force is so adjusted hydraulically that no extra force is applied on the wagon walls. After a pause of 3 sec., return cycle starts. The release of the top clamp device takes place at 40 (approx) from the rest position.
The cradle platform with empty wagon comes to rest position. The empty wagon is pushed out and the platform becomes ready to receive next loaded wagon.
The weight of the empty wagon (if weigh bridge is installed) is recorded. The empty wagon is then pushed away from the cradle table and next loaded wagon of the rake is placed on the table for tipping operation.
The tippler is interlocked electrically with Side Arm Charger and succeeding equipment (feeders below hopper) with respect to operational & safety requirement.

Main Components :

- Ÿ Tippler drive Unit (Hydraulic Drive with Power Pack) I Electro - mechanical
- Ÿ End Ring with Sector Gear
- Ÿ Movable Side Support
- Ÿ Top clamping arrangement
- Ÿ Tippler platform
- Ÿ Brakes
- Ÿ Counterweights
- Ÿ Hydraulic Clamping
- Ÿ Main bearing and main shaft

Special features:

- Failsafe EM Brake
- Hydraulic clamping system.
- Maintenance free operation.
- Robust & reliable.

Salient Features :-

1	Type	Hydraulic
2	Capacity of wagons that can be handled at a time	140 tonnes gross weight of each wagon (Max)
3	Rail track gauge	1676 mm
4	Load capacity	140 t gross
5	No of tippling per hour	25 tips per hour
6	Angle of rotation(Approx)-degree	160 Max.
7	Height of wagon handled	3160 to 4000 mm.
8	Width of wagon handled	3130 to 3660 mm.
9	Power pack details	2 X 132 Kw for Drive & 2 x 45 Kw for clamping
10	Type of lubrication arrangement provided	Manual
11	No of clamps provided (Hydraulic)	Six

Tipping time cycle

(I) Placement of loaded wagon & ejection of empty wagon	:	59 seconds
(ii) Weighing of loaded wagon	:	3 SECONDS
(iii) Tip	:	39 SECONDS
(iv) Pause	:	5 SECONDS
(v) Return	:	35 SECONDS
(vi) Weight of empty wagon	:	3 SECONDS
Total	:	**144 SECONDS**

SIDE ARM CHARGER

Side Arm Charger is a marshalling device to position the loaded wagon centrally on tippler platform one by one for unloading operation by wagon tippler. Side Arm Charger is a rail mounted machine used to pull the loaded wagons along with the rake & push out the empty wagon from the tippler platform after tippling.

Operation :

The full rake of 58 wagons shall be brought in by locomotive and stopped with the first wagon within range of the Side Arm Charger. The locomotive is then taken away. The charger shall be driven towards the first wagon, its arm is lowered and it is coupled to the first wagon of the rake. The charger then hauls the rake forward by one wagon length and stopped. Here the first wagon is decoupled from the rake manually. The charger then propels the first wagon on to the tippler table centrally and then automatically decouples and clears off the tippler. Now the wagon tippler is ready for operation. In the meanwhile, the side arm charger is moves back to initial position for next cycle. In next cycle, the rake is drawn up by the one wagon length, and the previously tippled wagon is ejected simultaneously. After tippling of the last wagon, the charger is used under manual control to eject the last wagon from the tippler, if the next wagon is not already in position.

The Side Arm Charger is run on a separate pair of rails which runs parallel to wagon tippler rail. Approximate travel length of the charger is 33M. Side Arm Charger movement on rail is actuated by the rack & pinion arrangement. Three numbers of driving pinions are mounted on output shaft of planetary gear box coupled with hydraulic motor or directly coupled with hydraulic motor. The hydraulic motor is driven from hydraulic pressure and flow generated from a power pack positioned at operator cabin.

Side Arm Charger is connected to the rake of wagon by a swing arm. The swing arm is raised and lowered by a hydraulic cylinder which is powered by the same power pack. Electric power to the machine is fed through the festoon cable mounted along the SAC machine track.

The SAC is of robust construction and designed for continuous duty.

The SAC arrangement has convenient access for inspection and maintenance of all parts. Adequate platforms are provided for ease of maintenance. Ladders and safety hand railings are provided wherever required.

Main Components :

- Hydraulic power pack
- Electric supply system
- Supports
- Rack and pinion
- Buffer stop etc.

Special features:

- Hydraulically operated for movement and arm hoisting/lowering.
- Brake integral with hydraulic motor.
- Robust & reliable
- Suitable for continuous duty

Side Arm Charger

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This Side Arm Charger with chain and sprocket design has haulage capacity of 15T. For 35T and above haulage capacity, Rack and pinion design Side Arm Charger is supplied. Our data given above is for Rack and pinion design. Haulage capacity, of Side Arm Charger is dependent on track layout on INHAUL side of Wagon Tippler

Salient Features :

1.0	Type	Hydraulic
2.0	Gross weight of equipment (approx)	58 t (for rack & pinion design) / 32 t (for chain & sprocket design)
3.0	Dimension (L x B X H) (main body)	10.15 m x 3.0 x 5.40 m (approx)
4.0	Operating Speed :	
4.1	Forward	0.5 m / sec
4.2	Reverse	0.5 m / sec
5.0	Tracie effort for pushing & pulling	35 T to 52 T
6.0	Mode of Power Supply	Festooning arrangement / Energy chain
7.0	Drive arrangement envisaged	Hydro motor with Planetary Gearbox or Direct Hydraulic Drive
8.0	Rating of drives	2 x 160 KW, 1500RPM (this changes based on duty conditions)
9.0	Type of lubrication arrangement provided	Centralized Manual Grease lubrication
10.0	No. of carriage wheels & Guide wheel	Four each
11.0	Track Gauge	1480 mm(CCI)
12.0	Travel Length	33 m

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