

## Review on Design of Railway Wagon Truck Loading and Unloading Mechanism

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### Abstract

Rail wagon truck mechanism operates in Indian railway, can only load and unload on back side and no provision for side loading and unloading on railway platform. For Rail wagon trucks unloading no regular areas on platform. This paper mainly focused on study on different railway wagon truck loading and unloading mechanism operated in the world. To identify the different parts of the mechanism for development of new design model of proposed truck loading and unloading mechanism on railway wagon for Indian railway.

**Keywords:** loading and unloading, railway, truck, wagon

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### INTRODUCTION

Indian railway systems are the world's second largest railway system under a single management. Truck on train service started in 1999.

The Konkan railway Corporation introduces truck on train service between Kolad in Maharashtra and Verna in Goa.

This system is also known as RORO service. Indian railway saves fuel, toll, time losses due to traffic jams, vehicle operating hours by allowing trucks to be transported on railways.

The truck drivers of loaded trucks can sleep in the cabins of trucks. So drivers can take rest or sleep while train journey to manage rest period regulation.

For the truck on train system a special type of wagon design i.e. closed coupled flatcars with small wheel diameter are used.

These wagons are interconnected to each other to make provision for truck to travel on. Trucks are loaded on wagon from ramp provided on one end of wagon. Trucks are loaded one by one. The unloading is done in same manner as loading, the first truck loaded on wagon is unloaded at last by this system.

There is no provision for side loading and unloading of trucks in existing system. For unloading one of intermediate truck from the train then its successive trucks first have to unload.

In Konkan Railway system the trucks are load and unload only on the back side of wagon.

Truck drivers are known to deflate tires before loading truck on train & pass through height check of tunnels over the railway and fill it to normal level before driving back on road. <sup>[1-4]</sup>

Different types of mechanism used for loading and unloading of trucks on railway wagon.

### MECHANISM USED IN INDIA – “KONKAN RAILWAY”



In Konkan Railway system special wagons are used to provide drivable trucks along the entire train on BRN wagon. In this arrangement trucks are loaded through a ramp provided at the dead-end of loop on BRN wagon. These wagons are usually closed coupled to each other with small wheel diameter.

At both end of the railway platform there are purpose-built terminals that allow the trucks from train to be easily loaded & unloaded. <sup>[4]</sup>

### MECHANISM USED IN “FLEXIWAGGON”



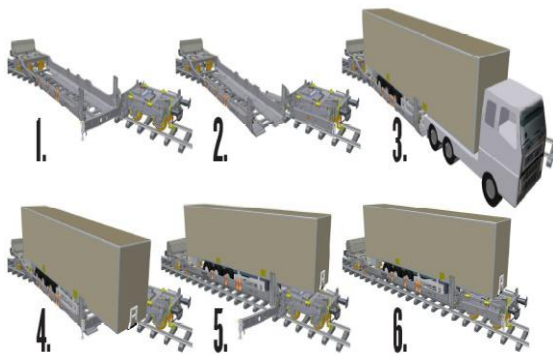
Flexiwaggon combine trucks, buses, cars, containers and Lorries on one and the same wagon. Flexiwaggon mechanism provides great opportunities in transport systems. Flexiwaggon carries the equipments which are necessary for loading and unloading of trucks with the same wagon.

Flexiwaggon carrying trucks can load and unload by truck drivers. Flexiwaggon can attain the speed up to 120 km/hour. and loading or unloading of trucks from flexiwaggon can take place horizontally along the wagon. The equipments needed for loading and unloading are integrated with flexiwaggon.

At the loading or unloading site these equipments make overhead rail link. The operation consumes 10–15 minutes to load or unload complete train.

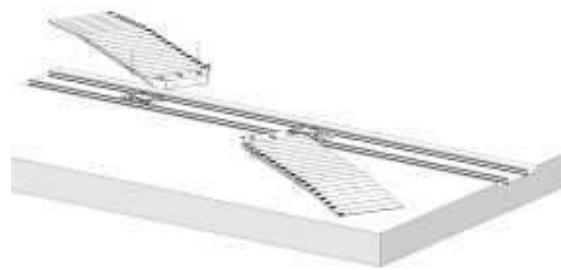
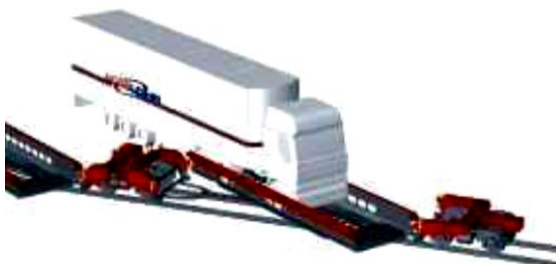
The flexiwaggon can be opened at both ends and turned to the left and the right, the trucks can drive on and off the flexiwaggon and there is no need for reversing the trucks. <sup>[5]</sup>

### MECHANISM USED IN “MEGASWING WAGGON”



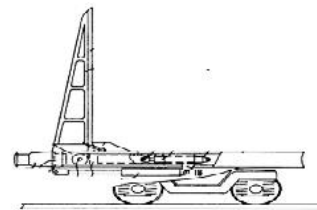
Megaswing wagon provides facilities for trucks, Lorries, buses, etc. to load or unload at the side of rail track. At the site where suitable space is available for trucks or trailer handling, the train can unload. Terminals are set up for facilitate the loading and unloading the vehicles (temporary or permanent. Megaswing wagon is convenient way of loading/unloading because it can takes place at any place where suitable trucks handling facilities are available. Megaswing wagon reduces the congested terminals. Megaswing wagon is divided into two parts. Middle section of wagon turn and end section remain on the rail. Middle part swung out and lowed to level with ground. A trucks, Lorries and semi-trailer can then be drive up into the pocket of wagon. Once the truck is releasing the wagon then pocket section can be pivoted back into position. This can be done from either side of the megaswing wagon. <sup>[6]</sup>

### MECHANISM USED IN “MODALOHR WAGGON”



As soon as the train stops, the wagons are reentered on the position with respect to the opening systems. Wagon stopped with respect to the ground system, and then the low-frame platform is unlocked. Once the low-frame platform is unlocked by the platform personnel, the complete wagon's vertical load is taken by the ground based equipment. Ground base equipments then pivots the low-frame platforms. The ground base low-frame platform is rotated by the ground opening system. The truck is loaded on wagons by driving in a straight line path. After loading the truck the wagon pivoted by ground systems, the truck is locked in the wagon and now is ready to leave from the ground system. <sup>[7]</sup>

### US PATENT



A special wagon at one end has thereof a movable ramp which may be lowered simultaneously with buffer on wagon. The movable ramp and the platform on wagon carry rails on which the container can roll.<sup>[8,9]</sup>

### REAR TIPPER BODY FOR TRUCK

The trucks used to tipper for versatile use on all the construction sites. Superior for its mobility and the quick unloading process make the trucks a vehicle that is ideally tailored to the requirements of the construction industry. High payload: an optimized vehicle design makes this possible, perfect on uneven terrain: where long semitrailer trains reach their limits, the trucks come into operation ever more. Rounded steel bodies in various versions: the Schmitz Cargo bull modular system offers more choice.<sup>[10]</sup>

### CONCLUSION

Extensive literature reviews are studied for collecting information about different types of loading and unloading mechanism used. This study deals with development of new design model of proposed truck loading and unloading mechanism on railway wagon for Indian railway. This paper identified the different parts of mechanism and different types of forces acting on loading & unloading mechanism. For proposed model should have the provision for side truck loading and unloading from rail wagon.

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