



USE OF WORKING PLATFORMS ON FORKLIFT TRUCKS

Nenad Miloradović¹, Rodoljub Vujanac² Danijela Miloradović³ Blaža Stojanović⁴

Summary: The use of specially constructed working platforms or cages attached to forklift trucks and intended for elevating persons is discussed in this paper. Different types of these platforms are utilized for temporary and occasional tasks such as repairs, maintenance work or inspections and for longer-term or extensive work. The application of working platforms with forklifts is covered by FEM rules established by European Federation of Materials Handling. The FEM rules define the specifications for special features of work platforms and specify the conditions under which they may be operated in combination with forklifts. Special attention will be given to the use of forklifts with non-integrated working platforms and very narrow aisle forklifts with permission control working platform. The aim of the paper is to establish requirements for proper use of working platforms on forklift trucks in order to prevent abusive use and minimize any associated hazards.

Keywords: working platforms, forklift trucks, FEM

1. INTRODUCTION

There is a variety of equipment available for work at height, including scaffolding, tower scaffolds, mobile elevating working platforms (MEWPs), staircases, platforms, and portable ladders [1]. The selection and use of an appropriate and suitable method of access will depend on the nature of the task to be carried out, the frequency of occurrence, the duration of the work and the availability of equipment.

Industrial forklift trucks are intended for transporting and lifting loads. Primarily, forklift trucks are intended for lifting materials and not people. Nevertheless in exceptional circumstances when fitted with a work platform they may be used to lift people to carry out occasional tasks at height. This use is exceptional (temporary and occasional) for tasks such as repairs, maintenance work or inspections for which the use of a mobile elevating work platform (MEWP) is not practical due to cost or space reasons or on account of other local circumstances. Working at height is a high-risk activity and the planning, selection and use of a safe means of access and working area is important [2, 3].

¹ Mr Nenad Miloradović, M.Sc., Kragujevac, Faculty of Engineering, mnenad@kg.ac.rs

² Mr Rodoljub Vujanac, M.Sc., Kragujevac, Faculty of Engineering, vujanac@kg.ac.rs

³ Dr Danijela Miloradović, Ph.D., Kragujevac, Faculty of Engineering, neja@kg.ac.rs

⁴ Mr Blaža Stojanović, M.Sc., Kragujevac, Faculty of Engineering, blaza@kg.ac.rs

2. WORK PLATFORMS

Work platform is a specially constructed platform or cage attached to a truck for elevating persons to carry out work at height.

Persons may be lifted only by means of work equipment and accessories provided for this purpose. While workers are on work equipment designed for lifting loads the control position must be manned at all times. Persons being lifted must have reliable means of communication. In the event of danger, there must be reliable means of evacuating them.

For longer-term or extensive work, special equipment e.g. scaffolding or a mobile elevating work platform (MEWP), must be used. The use of work platforms with industrial trucks has been discussed for years from different points of view. FEM document [4] is designed to prevent undesirable situations like lifting persons standing on the fork or on a pallet without any protection, as shown in Figure 1.

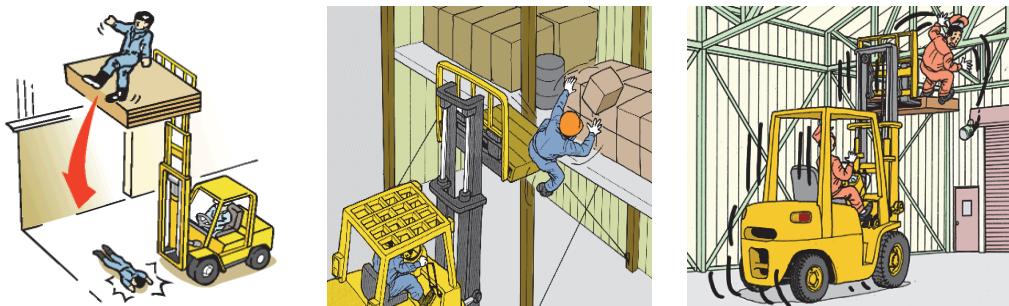


Fig. 1 Examples of incorrect use of work platforms on forklift trucks

Such dangerous and accident-prone misuse can be prevented by a simple economic and practical solution being implemented which ensures user safety (Figure 2).



Fig. 2 Examples of correct use of work platforms on forklift trucks

People who work on platforms and truck operators should be properly trained and given full instructions on safe systems of working with platforms, including the action to be taken in the event of an emergency and the dangers associated with leaning out of the working platform. Examples of forklift trucks fitted with platforms are given below [5]. Figure 3 shows a forklift with non-integrated working platform. Figure 4

presents variable reach trucks, while Figure 5 shows the use of work platforms on trucks operating in very narrow aisles.



Fig. 3 Forklift truck with non-integrated working platform

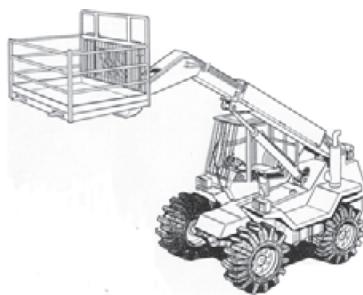


Fig. 4 Variable reach truck with non-integrated working platform

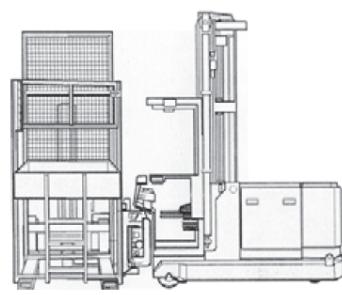


Fig. 5 very narrow aisle truck with permission control working platform

“Non-integrated working platforms” are attachments for use in conjunction with forklift trucks to elevate people so they can work at height but they have no controls in the platform that allow a person in the platform to control the lift height of the truck or move the truck; i.e. all truck and working platform movements are controlled by the truck operator.

2.1 Requirements for work platforms

FEM document defines the specifications related to the special features of work platforms intended for exceptional use and specifies the conditions under which they may be operated in combination with industrial trucks.

A truck fitted with a work platform shall be controlled exclusively from the normal operator position of the truck. If this combination of a work platform with a truck is controlled from the work platform then it is assumed that the characteristics corresponds with a MEWP and is therefore outside of the scope of this FEM document. The number of persons allowed on work platform is limited to two.

The work platform floor shall be enclosed, level and slip-resistant. It shall not be possible for e.g. water to accumulate on the platform. Openings shall not be wider than 15 mm in any direction. At any point the floor shall be capable of supporting a mass of 125 kg applied over any area of 0.16 m² without permanent deformation.

To prevent persons or objects falling from the work platform, surrounding protection is required consisting of a top rail, a toe board and one or more intermediate rail(s). The top rail shall have a minimum height of 1000 mm and shall encompass the platform and be permanently attached to the floor. The toe board shall have a height of at least 150 mm. The intermediate rails, shall be equally spaced between the top of the toe board and the underside of the top rails. Other equally effective means of guarding between the top rail and floor, such as wire mesh, panelling and/or safety glazing may be used.

Work platforms must have access means. When using a gate, it should not open outwards and should be self-latching when closed.

Screens or guards should be fitted to the work platform to protect persons from being trapped, crushed or sheared by the truck lifting mechanism or any other hazardous parts. The screens and guards should be of sufficient size to prevent persons from reaching through, over and around them into hazardous parts of the truck. The height of the protection should be at least 1,80 m or higher and should be in the form of a mesh covering the whole width of the lifting gear or work platform, whichever is the greater.

The work platform should be designed in such a way that it may be securely attached to the industrial truck and prevented from shifting, tipping or sliding in both the transverse and longitudinal directions by e.g. the fork arms secured in pockets by means of bolts, bars, straps or ratchets. The fork pockets on the platform should be enclosed. Any loose components associated with the locking device should be secured to the platform so that they cannot be mislaid when the platform is not in use. In order to avoid tilting, the fork arm pockets are to be designed for maximum possible width apart. If this is not possible, tilting should be prevented using additional measures, e.g. bolts and screws.

The following minimum details should be attached to work platforms in a clearly legible and indelible manner (e.g. indelible lettering):

- Name and address of the manufacturer or authorised representative,
- Designation of the model or type,
- Serial number with the year of manufacturing,
- Unladen weight of the work platform,
- Distance of the centre of gravity of the platform from its mounting face on the truck,
- Number of persons permitted on the work platform,
- Carrying capacity in kg.

An additional plate should be supplied by the platform manufacturer which should be fitted to the platform in a position where the truck operator can easily read it with the following information:

- Check that the work platform is properly fixed to the truck.
- Movement of the truck is not allowed if the platform is elevated.
- Check that the floor of the work platform shall be level.
- Check that the transmission is in neutral position and the parking brake is applied.

The capacity and stability of the truck with a work platform attached is sufficient if the following conditions are met:

- the floor area of the work platform does not exceed 800 mm x 1200 mm
- the work platform is attached transversely to the longitudinal direction
- the work platform is fitted directly on the fork arms
- the minimum capacity of the truck depends on the sum of the weight of the unladen work platform, the weight of the person(s) being carried and any load, e.g. tools, spare parts.

It shall be at least:

- 2 times the sum of the weight for order picking trucks and lateral and front stacking trucks, designed to travel with elevating operator position and trucks specifically designed to travel with elevated load.
- 3 times the sum of the weight for counterbalanced and reach trucks.

- 5 times the sum of the weight for the variable reach trucks and pedestrian controlled trucks but not less than 1000 kg.
- the truck is used on a level floor. For use on different floor conditions the specification of the truck must be agreed between the user and the truck manufacturer.

Work platforms should only be fitted to variable reach trucks or used on trucks that have a safety mechanism which ensures that all movements are prevented if there is a leakage or failure in the hydraulic system. Work platforms should not be fitted to trucks fitted with attachments, the movements of which could give rise to dangerous situations.

It is recommended that the fork arms should support the whole work platform but the fork arm length should not be shorter than 75% of the platform dimension measured in the longitudinal direction of the fork.

Additional requirements for work platforms used in very narrow aisles are:

- A safety mechanism should be fitted which ensures that persons on the work platform are unable to reach hazardous positions between the work platform and the racking equipment with parts of the body, e.g. head, torso, hands, arms, feet and legs.
- In order to safeguard against crushing and shearing with parts of the racks, it has to be ensured that travelling, lifting and lowering movements are only possible if the work platform is fully enclosed.
- If the work platform is fitted with a permission switch for travelling and lifting movements for each person being carried.
- If the work platform has a fully-closed and impenetrable fencing of at least 1.80 m in height (with a maximum mesh width of 50 mm x 50 mm). Moveable parts of the fencing must be secured by a control block which only allows travelling, lifting and lowering movements when the fencing is closed.

In order for a working platform to be mounted to a forklift truck for the purposes of lifting a person, the following is needed to be done:

- Select a suitable truck, ensuring it has adequate capacity, that the platform can be secured correctly, that the person in the platform has no access to moving parts of the forklift truck, that unsuitable movements can be disabled while the platform is attached.
- Ensure that the truck operator remains at the controls while ever the platform is elevated.
- Ensure that a communication strategy is in place between the operator of the forklift truck and the person in the platform.
- Ensure that the forklift truck is not driven while ever the platform is raised.
- Ensure that restraint lanyards and harnesses are used appropriately.
- Ensure that any users of the platform have been fully trained.

3. CONCLUSION

The above stated requirements are necessary to minimise hazards arising from the combination of a work platform with an forklift truck. Residual hazards should be addressed by the user following his risk assessment. Each work platform must be

provided with an instruction handbook in the language of the country where it is used. These instructions must contain the following information as a minimum:

- Information about the work platform: Name and address of the manufacturer, designation of the model or type, description of the work platform (functioning, dimensions and safety installations), details of the carrying capacity (net weight, number of persons and load).
- Information about the truck: Description of the truck required for the use with the work platform (type and capacity).
- Information on operation with the work platform: The platform should only be used in combination with designated forklift trucks. The following information should be supplied: about the training of the operator of the truck and the persons using the platform, about the need to wear personal protective equipment, about communications between the operator and the person(s) on the work platform, about lifting, lowering, tilting and travelling, about minimum floor requirements, about handling existing side shifter and tilt mechanism, about how to react in the event of a blockage of the lowering movement, about preventing truck movement with the work platform raised, about improper use of the work platform, etc.
- Inspection and maintenance: Information about checking the functions and condition of the work platform prior to use. Information about maintenance. Information about the purchase of spare parts. Information about defects which impede safety. Information about periodic checks.

REFERENCES

- [1] Rushton A., Croucher P., Baker P.,(2010). *The handbook of logistics and distribution management*, 4th edition, Kogan Page Limited, London
- [2] Miloradović N., Vujanac R., Stojanović S. (2011). Stacking aisle width for forklift trucks in palletized storage and handling systems. *DEMI* 2011, p. 899-904.
- [3] Вујанац Р., Славковић Р., Милорадовић Н.(2006). Warehouse solution for "Montefarm" apothecary building in Montenegro (in Serbian). GNP 2006, p. 953 – 958.
- [4] FEM 4.006 (2005). *Exceptional Use of Work Platforms With Industrial Trucks*. Federation of European materials handling, Product Group Industrial Trucks. Brussels.
- [5] Health and Safety Executive. Working platforms (non-integrated) on forklift trucks, from <http://www.hse.gov.uk/pubns/pm28.pdf>, accessed on 2013-02-10.