IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE)
e-ISSN: 2278-1684,p-ISSN: 2320-334X, Volume 12, Issue 6 Ver.III (Nov. - Dec. 2015), PP 61-65
www.iosrjournals.org

Reducing Straddle Carrier accidents at the Port

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Abstract: *The Straddle Carrier (SC) is a very popular piece of equipment. These carriers can undertake a variety of handling operations such as loading, unloading, stacking and transport of containers between the landside and waterside. Its popularity is due to its space efficiency and flexibility.*
Traffic incidents are a serious problem at marine terminals, where heavy equipment is used to load and unload ships and move freight from place to place in the terminal. The work is fast-paced, conducted at any time of the day or year, and often performed in inclement weather. Vehicular traffic endangers any worker walking in a marine terminal
In a typical straddle carrier operation, what procedures/methods can be put in place to move towards a zero accident policy? It goes without saying that the operator should be properly trained. But how do you make sure that it is the trained operator that is driving, and what mechanisms can you put in place to monitor and review the safe operation of the equipment. Waiting for the next accident is not an option (Lambert 2009:1).

I. Introduction

All container terminal operators recognise the benefits of improving operational welfare for their employees and on-site contractors.

Lambert (2009:60) states that it is without doubt that many have also adopted a proactive approach to operational safety, recognising not only the benefits to the welfare of the workers through a safer working environment, but also the additional benefits this will bring to the day to day operation by minimising disruptions and providing a more stable and predictable operating environment. However, how do you achieve the implementation of best practice in a busy container terminal where the operation is spread over a wide area, and just as importantly how do you measure the effectiveness of your efforts?

In a typical straddle carrier operation, what procedures/ methods can be put in place to move towards the end goal of a zero accident policy? It goes without saying that the operator of a 60+ tonne machine that is capable of carrying a load of up to 60 tonnes should be properly trained (Lambert 2009:1).

II. Objectives of the study:

The main purpose of this study was:

- To identify reasons leading to straddle carrier accidents
- To make recommendations on ways to mitigate the accidents

III. Observations

- SC's collided with private trucks during loading and offloading of containers,
- They collide with each other (proving they have very poor visibility),
- SC's were a high priority when it came to safety concerns. Incidents vary from damaging of property to SC's overturning.

Figure 1: Fence damaged by a SC

IV. Causes

There are many factors that can contribute to traffic incidents in marine terminals. Often, these incidents result from a combination of factors. The following points illustrate common traffic-safety problems:

Unsafe equipment

Broken, improperly maintained, or missing safety equipment, such as lights, seat belts, brakes, and horns, can lead to injuries and fatalities.

Inadequate traffic controls

Lack of proper signage and lane markings may lead to injuries and fatalities.

Condition of terminal driving surfaces

Many marine terminals, particularly larger ones, have paved terminal driving surfaces. Paved surfaces, which are smooth, are desirable because they reduce the potential for vehicle tip-overs, cargo and equipment shifting, and operator bouncing, and allow for improved road markings (e.g., lane markings). However, smooth driving surfaces also require heightened awareness because they can become slippery when wet and contribute to excessive vehicle speed. Employers must ensure proper maintenance of road surfaces because, over time, paving material can settle and result in uneven surfaces, potholes, and sinkholes that can lead to tip-overs or other vehicle incidents which could result in injuries or fatalities.

Inadequate illumination: Poor lighting, particularly at night, and shadows can make it difficult for drivers to see and avoid pedestrians, hazardous driving surfaces, and other obstacles.

Fatigue: Marine-terminal workers often work long and irregular hours, which can lead to fatigue and sleepiness.

Fatigue and sleepiness can impair operator performance and contribute to traffic-related injuries and fatalities

V. Recommendations

In the following example the implementation of relatively inexpensive technology has been used as a significant step to move towards the goal of zero tolerance.

Training

After putting a training and authorisation regime in place the next step is to make sure you know who is driving. This is a relatively simple step and is already quite common throughout ports and terminals.

Restrict access

In this example a machine readable identity card access system has been utilised. There are however key features that need to be considered when implementing such systems and these are sometimes overlooked (Figure 2).

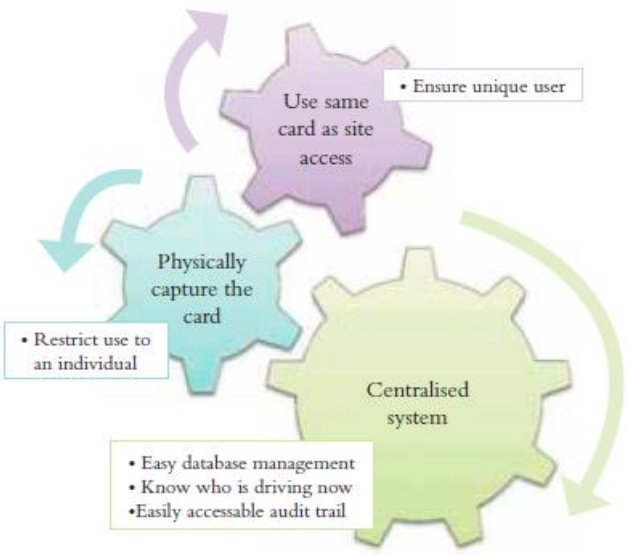

Figure 2: considerations for access restrictions

Centralised system

Unless you only operate one or two items of equipment or only have a similar low number of trained operators, one of the most important aspects of access control on mobile equipment is a centralised access control software application. The software application is connected to all the mobile equipment via a wireless connection and this approach provides several benefits including:

- Easy database administration for removing old or lost cards and adding new users (no need to visit every machine to update).
- The ability to set up time and equipment restrictions and easily change them as required.
- Centralised audit trail (look at who is driving now, and who drove what when).

Card type selection

Lambert (2009:60) states that there are also major security benefits in controlling access to the equipment by using the same ID cards that are used for general access to the site. In tandem with this is the use of a card capture system where the card must be positively inserted in a card holder whilst the machine is in operation. In the example shown in Figure 3, cards are inserted into an industrial reader with the system reading the card and recognising if the card is removed. This approach brings several benefits:

- Audit trail for site entry and machine use (eliminates working a double shift for a friend).
- Ensures ID is that of the operator (not just a general Radio Frequency Identification device to start the machine).
- Equipment operation restricted without the use of a valid card.
- Once stationary, the machine will not move if the card isremoved (prevents leaving the machine running during shift break and a fresh operator using without a valid card). The implementation of these types of systems will provide a terminal with a full audit trail of who, what, and when, and also ensures only trained approved operators use the equipment.

Figure 3: Card system used in operations

Fatigue

Employers should learn about, and train workers about, the hazards of driving when fatigued or drowsy, and how to detect those conditions. Employers should also help workers learn how to deal with fatigue and how to know if they are too fatigued to operate a vehicle.

LED floodlights

Hertel (2009:70) states that installing energy-efficient LED floodlights onto container cranes dramatically reduces their energy consumption from lighting, virtually eliminates lighting-related maintenance requirements, and moves terminal operators closer to universal goals of safety, sustainability and profitability.The use of LED floodlights can eliminate constant maintenance in this difficult area while improving light quality. Just as crane manufacturers have engineered revolutionary advances, so too have LED fixture manufacturers, making these lights ideally suited for the harsh, corrosive environment in which container cranes operate. LED fixtures are also beneficial for ship-to-shore (STS) cranes that can experience power outages and necessitate a wait time of up to 20 minutes for a traditional light source to strike and return to full intensity. LED technology minimises downtime, increases safety and improves operational efficiency. Access to the light fixtures on cranes can be difficult and dangerous. With LED technology, no re-lamping is required during usable lifetime. Properly designed LED fixtures will not fail catastrophically, but rather slowly dim.The light source is assumed to have run its lifespan when light output reaches less than 70 percent of the original amount. In fact, well-designed fixtures can last over 50,000 hours, eliminating equipment downtime due to lamp failure. For a port operating with lighting 24 hours a day, a fixture could last 5-7 years!

LED technology also offers a great deal of versatility. If a port operator prefers a warmer light source, lenses can be inserted over the luminaire to decrease the colour temperature. Furthermore, a modular design of LED fixtures allows for customisation specifically for crane heights. The directional nature of LED light allows for improved light penetration at the bottom of the vessel hold and improves operator viewing conditions.


Figure 4: Using LED floodlights at the Port

VI. Conclusion

In this article the implementation of relatively inexpensive technology has been used as a significant step to move towards the goal of zero tolerance. Common causes of accidents have been identified and if the recommendations are followed, our goal towards a safer port environment will be achieved which will result in a boost in production.

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