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**'Warehouse Racking Safety:  
The Importance of Inspection and Maintenance'**

Steve is a chartered and structural civil engineer. Early on in his long career he spent 10 years on north sea oil rigs, moving on to Nigeria and ending up in the Middle East - making a swift exit from Iran one week before the Shah did! (He knows when to run!)

On Steve's return to the UK he moved into the roofing industry for a short while. He has been in the racking business for 30 years and is now a consultant, concerned in particular with safety codes of practice covering the building of racking and design criteria etc.

To highlight what can happen when racking fails, Steve first showed some quite alarming video footage (see BHSEA website ([www.bhsea.org.uk](http://www.bhsea.org.uk)) of three separate incidents: two where racking had collapsed as a result of a collision with a fork lift truck and one where the racking collapsed for no immediately apparent reason.

In the one clip an inspection had previously been undertaken and the quotation for repair work came to £100k. The General Manager made some choice comments to the effect that this was beyond his means! Five days later the collapse occurred.

The Russian video clip highlighted how quickly the driver's colleagues came to his aid when the racking collapsed. Steve wondered whether that would be the case in the UK? With health and safety legislation as it is now, people are often reluctant to get involved in case their boss is critical of their actions or they become hurt in the process.

**Warehouse Safety - Why do we need Racking Safety Inspections?**

- To prevent and minimise the effect of incidents
- To comply with the requirements of the Workplace Health, Safety and Welfare regulations, or the Provision and Use of Work Equipment Regulations (PUWER).

Racking falls under the definition of work equipment. It is likely to support a considerable load and be up to four metres in height and so should be treated and maintained carefully.

## ***The possible consequences of a moment's carelessness:***



Imagine how long it would take to get this warehouse back to normal and the effect upon client relationships due to the consequent delay in fulfilling orders!

Note that an investigation into the cause of such an occurrence can take a considerable amount of time as it may not be that straightforward.

So, firstly the racking needs to be inspected to identify the risks. Secondly, any repair work should be done quickly and effectively.

### **How long should racking last?**

It can last 30-40 years, if properly maintained. If not, it could last less than a year.

### **The Importance of Racking Inspections – What you should be doing / frequency / records / survey action points:**

#### **1 Damage inspection by warehouse operatives**

Report all damage as it occurs. It is best practice to foster a culture whereby employees are encouraged to report damage rather than “walk on by”, so that the necessary action can be taken to repair it speedily to avoid a catastrophe.

Disciplinary procedures as a result of such reporting must be the exception or little will be reported. However, it is important that accident-prone individuals are identified for extra training.

CCTV can pick up information relating to activity which causes accidental damage. However, this may or may not be responsible for an accident arising shortly afterwards, as damage could also have occurred at other times or indeed, built up over a period of time.

#### **2 Weekly inspections as a visual check from ground level**



These can be carried out as part of a Supervisor's patrol, with documented action points for serious damage found.

### 3 Annual or bi-annual inspection by 'technically competent person'.

Defined as someone who has been formally trained to recognise and anticipate a potentially dangerous situation and recognise the likelihood and consequence of a subsequent incident.

When conducting an inspection this person should:

- carry out a detailed examination of the storage
- check records to confirm points 1 and 2 (above) are being carried out
- review damage history, looking for repetitive damage and propose solutions, if appropriate
- identify any changes required to equipment or working methods to prevent a recurrence of the problem. This may include formal driver training programmes, alteration/replacement of upright protection, briefing sessions to warehouse staff etc. (*Steve commented that the Fork Lift Truck Driver training course has no requirement for the trainee to put a pallet on the truck!*)
- seek expert advice in cases of doubt
- document and report any findings and recommendations regarding repairs and
- confirm that the necessary action is being taken.



If repairs cannot be afforded, then the equipment must be taken out of service.

*There is a useful racking inspection checklist available within Steve's presentation slides (slide 8) on the BHSEA website [www.bhsea.org.uk](http://www.bhsea.org.uk). This uses a colour coded system: Red, Amber and Green according to the severity of the risk:*

### **Red risk**

**Areas where a high level of damage is identified which warrants immediate offloading and isolation until repair work is carried out**

### **Amber risk**

**Areas where the damage is sufficiently severe to warrant remedial work but not sufficiently severe to warrant the immediate offloading of the rack. Once the pallet positions in this area are emptied they should not be refilled until the repairs are carried out. If repairs are not effected in 4 weeks an Amber risk item automatically becomes a Red Risk item**

### **Green Risk**

**Areas where damage is present but it falls within the SEMA allowable limits and should be recorded for further consideration at the next inspection**

A '**Red Risk**' item will require a separate report and justify immediate action. The report should indicate:

- site location
- inspection date
- fault found
- action required
- inspector's signature and date
- manager's signature and date

### **Everyone has a responsibility to:**

- ✚ ensure that the implications of any change are considered and to maintain adequate safety margins
- ✚ recognise significant defects in the pallets and loads and initiate appropriate action
- ✚ place loaded pallets squarely on the support beams with corner blocks supported. *(Steve commented that temporary changes are sometimes made to the position of the horizontal beams which are only intended to accommodate a particular load shape/size. However, these are often not changed back, as the new position proves to be more useful. In these circumstances it is vital to be aware of and adhere to the load limits for the new configuration to ensure safe operation.)*
- ✚ be aware that some loads are not rigid and can slump causing problems on removal from the racking
- ✚ not side shift loads against rack uprights
- ✚ observe the special requirements of small parts storage (eg nuts and bolts)
- ✚ recognise the importance of cleanliness and tidiness in warehouse operations
- ✚ report damage as it occurs or as it is noticed during patrols and to know who to report it to.

### **A typical recommendation following inspection - Upright Protection**

- This may or may not be feasible. Sometimes adding protection can reduce the width of the aisle and lead to further complications and additional training for the fork lift truck driver.

- George Allcock commented that the need for additional protection could suggest that the overall design may need to be addressed to increase operating clearances, although he acknowledged that in practice this could reduce the amount of stock that can be accommodated in the warehouse (with obvious consequences to the business). He also stated that fork lift trucks from different manufacturers have different turning circles, affecting manoeuvrability in smaller spaces.

### The original supplier of the racking is responsible for:

- ✚ Ensuring that the structure is designed with and manufactured from materials that are fit for purpose
- ✚ Allowing for adequate factors of safety in the design calculations to provide sufficient strength and stability to accommodate the specified loads (normally by confirming that the design is prepared to the SEMA standards or to the appropriate structural codes BS5950, EC3 etc.)
- ✚ Having in place adequate quality control procedures for design, manufacture and installation
- ✚ Providing sufficient information to the users to allow them to use the equipment safely, normally being the provision of details of beam or support arm sizes, locations and safe working loads for the system
- ✚ Information provided on notices usually located on the ends of the racking

### The User is responsible for making sure that:

- ✚ Pallets are in good condition and the loads are correctly stacked on the pallets.
- ✚ Pallets can collapse if they are: -
  - Damaged
  - Poorly constructed
  - Of the 'one trip' type
  - The load is not uniformly distributed across the load area

### The Importance of Racking Repair

- When damage is identified that affects the safety of the racking system the racking should be offloaded and controls introduced to prevent it being used until repair work has been completed.
- Repairs by such means as welding or straightening are not approved by SEMA or by any of the SEMA manufacturing members
- All repairs should be done by the removal of a damaged component and its replacement by an undamaged one. All such work of course, must be carried out when the rack is not loaded!!





Some repairs can be easily carried out from floor level.....

.....others are a bit more complex. However, climbing the racking should never be necessary

Changing an upright should not involve climbing or heavy lifting.

**Whichever method you use, it should be the safest way appropriate for the circumstances.**

#### **Further guidance:**

- 'SEMA Code of practice for the Use of Static Pallet Racking' – free PDF available on request by e-mail to SEMA web site [www.storagesolutions.co.uk/](http://www.storagesolutions.co.uk/)
- Warehousing and Storage, A guide to health and safety - free download from HSE website [www.hse.gov.uk](http://www.hse.gov.uk) ref HSG 7.

George commented that years ago, pallets had been used to raise people up to the higher levels and the HSE issued technical notices on the requirements for cages in this regard. There are, however, a number of safety issues with this practice, including the possibility that the fork lift truck driver may inadvertently select reverse or full tilt, thus tipping the person out of the cage. Fork lift trucks are not designed to carry people; only do so under the right controls and using locking mechanisms.

George remarked that from his perspective, most damage to racking is caused by fork lift truck drivers. During his time working for GKN, one of their North American sites had this particular problem. Their solution was to install impact monitors on all trucks. The monitors send a signal back to a control panel, record the time of the incident and identify the truck and driver concerned. There is of course a cost implication but repairing racking can be prohibitively expensive. The monitors can help to prevent damage and improve driving standards. Steve advised that some trucks in the UK now have two keys and are designed to stop upon impact. The Supervisor is then required to use his key to reset the truck.

**Members' Questions**

**Neil Boon** asked, in light of CDM Regulations being in place for twenty years, why are we still running into racking? In his opinion, there would appear to be an inherent design problem with either the racking or the space it occupies? Steve replied that there were now fewer occurrences than there used to be, but that there was still room for improvement.

Neil also asked when the HSE would attend a site to inspect a racking incident. Steve replied that this would only occur in the case of a significant load of say 5 tons going through the floor or a sidewall or where there has been a fatality or someone has been seriously hurt leading to a seven day absence. Otherwise the accident would be investigated locally and the HSE would not need to be made aware of it.

**Steve Parton** remarked that he had seen racking where the uprights had been secured by only two bolts through the floor, even though there was provision for four. Steve Cowen replied that the four positions are to assist the installation i.e. where it is not possible to drill through the floor at a particular point due to encountering a reinforcing bar and so the adjacent position would be used. However, two bolts are usually sufficient.

**Lee Dargue** queried why there was an open question around how many to put in and if there were four holes and only two bolts were used could this be asking for trouble? Steve replied that fewer bolts were often used down to cost, not so much for the bolt but for the time taken to install each one. Either the designer or the racking manufacturer / distributor should indicate the optimum number for the load.

Another member asked Steve whether he had any experience of cantilevered racking and whether the same principles that applied to warehouse racking would apply to a cantilevered design. Steve replied that certainly the principles of inspection would be the same. SEMA have produced a cantilever design code regarding safe usage. Also, over the next two months SEMA will be running training courses on this very subject, what to look for, how to measure it etc.

Steve advised that SEMA hold an annual seminar which BHSEA Members would be able to attend but unfortunately this would not be free of charge.

**Anu Spratley** asked what conditions would warrant a bi-annual inspection regime. Steve confirmed that this would normally apply to a high throughput warehouse such as a Tesco regional distribution centre operating 24/7.

George thanked Steve for his most interesting presentation and dealing so adroitly with the many and varied questions from the floor!

**For Steve's presentation slides, refer to the BHSEA website [www.bhsea.org.uk](http://www.bhsea.org.uk).**