GUIDE TO LIFTING EQUIPMENT TESTING AND INSPECTIONS

There appears to be a lot of confusion in the workplace, including at major construction sites, Mines and Plants regarding the legal requirements for the inspection and/or testing of lifting equipment, which includes lifting machines, lifting tackle, hoists and fabricated lifting equipment. In an effort to provide guidance to users, inspectors, safety and management staff, we hereby submit the following information. It must be stressed that the information supplied is the writer’s opinion and provided without any malice or prejudice towards any manufacturer, supplier, user or service provider.

For the purpose of this document the following abbreviations apply:

- MHSA            Mine Health and Safety Act
- OHS           Occupational Health and Safety Act
- DOL            Department of Labour
- DMR            Department of Minerals
- ECSA           Engineering Council of South Africa
- DMR 18         OHSA Driven Machinery Regulation 18
- LME            Lifting Machinery Entity registered with the DOL
- LMI            Lifting Machinery Inspector registered with ECSA
- LTI            Appointed lifting tackle inspector
- LE             Lifting equipment
- LM             Lifting Machine
- LT             Lifting Tackle
- CR             OHSA Construction Regulations
- OEM            Original Equipment Manufacturer
- WLL            Working load limit as specified by OEM
- SWL            Safe working load

1. Visual Inspections compared to Examinations.

A visual inspection is done by “visually checking all visible components” (SANS 500) of a sling or hoist for example, and completing a properly prepared check list. This can be done by a person or inspector, appointed in writing by virtue of the person’s knowledge, experience and training.

An examination is a “detailed study by a competent person in such depth and detail as he considers necessary to enable him /her to determine whether the equipment being examined is safe to remain in use” (SANS 500) This could include stripping a unit, and conducting an operational test such as on a hoist. An examination should be done by a LMI or competent appointed technician or artisan.
It must also be noted that a new updated Draft DMR 18 has been published by the DOL under GNR.163 in Government Gazette #34052 of March 4, 2011. These new OHSA “DMR 2015 Regulations” should be promulgated hopefully by the middle of 2015. The contents of the new Regulations could affect inspection and testing requirements. New LE Definitions will also be published.

As a start it is common knowledge that all **lifting machines**, which are classified according to different Codes in Appendix 12 of the OHSA, DMR, must be load tested (performance tested) at intervals not exceeding 12 months. This load test must be conducted by a DOL registered LME. This actual load test must be conducted, or be supervised by an ECSA registered LMI.

The LMI is assessed and found competent by ECSA. The LMI can only test the types of lifting machines that he has been registered for, as a LMI by ECSA.

**Note:** ECSA do not print the scope of competence of the LMI on his LMI certificate. The only method for the user to establish whether this LMI is competent to load test a specific type of machine, is to request a copy of his ECSA confirmation of registration letter which reflects the scope of his competence.

**Note:** Where the MHSA does not specify any issue relating to health and safety, such as OHSA LME/LMI requirements, the requirements of the OHSA DMR 18 apply by interpretation of the MHSA Section 103.

The following questions are regularly asked in the work place.

Our comments, if not a legal requirement, is provided based on best practice.

2. **Who is a Competent Person to conduct examinations, as well as inspections of Lifting Machines?**

   As there is no definition for a Competent Person (CP) in the DMR, one should consider the definition of a CP as it is specified in the OHSA CR, as these where published in 2003 and since been updated, compared to the DMR which was published in 1993. No recent updates in DMR have mentioned the definition for a CP other than the requirements for an LMI.

   It is clear that the LMI has to conduct, or supervise the periodic actual load testing of lifting machines, but it is not clear whether the 6 monthly thorough examinations have to be conducted by a LMI.

   The Draft DMR 2015 mentions a “person with knowledge and experience……” and therefore would imply that, in future, you would not have to be a LMI to do these thorough examinations.

   **Comment:** Wait for the new DMR definitions, but at least appoint someone in writing, with the necessary background, experience and training to conduct these thorough examinations, according to SANS standards and properly prepared check lists, without stripping or disassembling the machine.
3. **Must a lifting tackle inspector (LTI) be a LMI?**
   **The answer is no.**
   It must be stressed that a LTI does not have to be a registered LMI. The purpose and reason for appointing LMI’s is to conduct, or supervise lifting machine load testing only, and although they have to be qualified or competent to inspect lifting tackle as well, they should be competent to inspect lifting tackle as well.
   This issue was cleared up with government notice No: GRN 257 of the 7th of March 2008; “This registration does not apply to persons who examine lifting tackles in terms of regulation 18 (10) (e) of the Driven Machinery Regulations.”

4. **Who can inspect lifting tackle?**
   Lifting tackle has to be inspected, at least every 3 months by a LTI who should keep a register of these inspections on site.
   This is a specific requirement in terms of DMR 18.10(e).
   It must be noted that inspections can be conducted at more frequent intervals if so required by the user. No specific inspection periods are specified in the MHSA, Chapter 8 Regulations and mines have to specify in their Standard Operating Procedures (SOP) their inspection method, requirements, inspector qualifications etc.

   **Persons who inspect LT are suitably qualified persons, who by virtue of their knowledge, experience and training, are appointed in writing, by their employer to do.**
   There is currently no DOL requirement to register LTI’s, although this is anticipated in future. Nothing has changed and these inspections can be conducted by in house appointed LTI’s or contracted service providers, obviously at a cost to the user.
   If the user is using a service provider to conduct these inspections, the user should insist on the contractor’s staff providing proof of training and experience, and that they have been appointed, in writing, by their employer.

5. **Must lifting tackle in use be subjected to annual load testing?**
   **The answer is an emphatic NO**
   Over the last few years this practice has become popular, mostly as a result of the user’s ignorance due to lack of training, as well as service providers who provide this service for commercial reasons only and therefore promote it.
   **It must be stated that manufacturers of chain, wire rope and webbing, are totally against this practice as:**
   (a) **It is not a legal requirement** in terms of OHSA DMR 18 (10) or any MHSA Chapter 8 Regulations to conduct periodic load testing on slings.
(b) It can be detrimental to the service life of a sling or component as a test in excess of the WLL can develop a latent defect in the sling that could cause it to fail later on, under repeated loading. For example, to subject a sling with a WLL of 5 ton, that is 5 years old, to a static test load of 10 ton, which is equal to a 100% overload, can be detrimental or damaging to the sling, or to certain components of the sling such as hooks and coupling links etc.

(c) All OEMs specify a WLL for the size and type of sling supplied. This WLL is specified in the Standard, such as a SANS, to which the sling or product is made. The Standard as well as the OEM will state that the sling must not be subjected to a load in excess of this WLL. Once again, if you are testing the sling to a load above the stated WLL, normally 100% you are contravening the OEM’s specification and are therefore, by implication, contravening legal requirements. If it can be proved by the OEM of a sling that it was proof load tested in excess of the WLL, and it fails later in service, any claim against the manufacturer, by the user may be repudiated. It is also relevant to take cognizance of OHSA Section 15 “Duty not to interfere with, damage or miss-use things” when load testing slings in use to more that the rated WLL of the sling as this can damage the sling.

(d) For practical purposes, to proof load a webbing sling that has a design factor (FOS) of 7:1, you are not proving anything if the sling complies with SANS 94 / EN 1492. To test a 2 ton sling to 4 ton, proves nothing as the sling should not fail at a load of less than 14 tons. The worst quality 2 ton sling should stand a proof load of 4 tons but does not confirm that the sling is legal in terms of the Standard.

(e) All testing of lifting equipment, including lifting tackle, must be conducted in accordance with an “accepted or appropriate technical standard” There is no SANS or International Standard for load testing slings in use. There are only standards for the OEM to test new slings or components after manufacture and necessary heat treatment etc. Load testing of slings in use is therefore not allowed. Only lifting machines, not lifting tackle must be periodically load tested.

The different testing requirements or lifting tackle and hoists (chain blocks and lever hoists) must clearly be understood by Management and Inspectors.

Pg. 4
6. What type of certificates must be supplied with LT and hoists?

The word “Test Certificate” does not appear in the OHSA or MHSA.
It is common practice, and the user should insist on, suppliers to issue Certificates of Test and or Certificates of Conformance to a specific quality manufacturing Standard, when purchasing lifting tackle.

A Certificate of Test must state the actual test load, the date of test and other relevant details, whereas a Certificate of Conformance must state the Standard, such as SANS, DIN, EN etc, to which the product has been manufactured.

This certificate is regarded as the “birth certificate” of the sling and must be kept on record till the sling is scrapped, after which the certificate can also be cancelled as the equipment has been removed from the work place.

Slings must be marked with the relevant certificate number, or brand name of the manufacturer, for traceability back to the supplier.

The rule of thumb is “where does it come from and what can it lift?” If a sling is not marked with this information, do not use it!

It is also important that users have a written scrapping procedure that specifies the steps to take when scrapping LT, which must include cancelling the suppliers certificate, as the sling is no longer in service.

Lastly, it must be noted that companies which supply Lifting Tackle, or are OEM appointed distributors, do not have to be registered as LME’s if these companies are only suppliers and do not conduct repairs or load testing of lifting machines.

7. What are the requirements for Spreader and Lifting Beams?

Once again there is a lot of confusion as to the difference between these two products and this has been a grey area for various reasons.

A spreader beam is a strut under compression that spreads the two legs of a sling, and the spreader itself does not carry the load, whereas a loose lifting beam actually carries the load, and the beam is under tension and subject to bending and twisting forces.

A lifting beam is normally suspended from the crane hook with a two leg sling, or attached directly to the crane hook in the centre of the beam through a lug on the beam, or attached with a shackle.

A typical example of a spreader is a two leg sling with a pipe that has been inserted between the legs of the sling to spread the legs of the sling and thereby reduce any angle loading.

A lifting beam must be strong enough in construction to actually carry the load which is suspended from the beam itself.

These two products must also not be confused with a permanently installed overhead runway beam to which a hoist is attached with a trolley or crawl.
The word lifting beam does not appear in the DMR, but the definition of lifting
tackle includes “spreaders or similar appliances”. The DMR 2015 lifting tackle definitions include “lifting or spreader beams, tongs, ladles, coil lifters, plate lifting clamps, drum lifting clamps ….”. These products are not lifting machines and therefore are not subject to annual or periodic load testing.

It is however the prerogative of the user to insist on load testing, if he so wishes and this load test applied should not be in excess of 10% overload. Visual inspections on loose lifting and spreader beams should be conducted in accordance with proper inspection check lists.

8. What is the relevance of SANS or other Quality Standards?

It must be noted that no lifting equipment SANS or other Standards are currently incorporated in the DMR and therefore not mandatory or legally binding. The proposed DMR 2015 could incorporate a list of SANS, and possibly other International Standards, which will then become mandatory.

Current DMR 18.10 (a) states that all lifting tackle must be constructed in accordance with a “generally accepted technical standard” and therefore, only LT that complies with existing SANS or other technical standards will be used. Proof of quality must be supplied in the form of a Certificate of Conformance to a Standard, issued by the Supplier and or Manufacturer.

Also the MHSA specifies compliance to “an appropriate standard” which does not mean that only hoists with a SABS mark is acceptable. This does not necessarily have to be a SANS, but can be DIN, ISO EN etc. Therefore inspectors cannot insist that a chain block or lever hoist cannot be used if it does not have a SABS mark on it!

The difference between a hoist which has a SABS mark and a hoist that is manufactured to either SANS 1636 and SANS 1594 must also be noted. A hoist with a SABS mark is not necessarily of better quality than one that has been tested by the SABS and complies with the relevant SANS for manufacture. Users should specify approved brands and appoint approved suppliers and, when purchasing, specify that hoists should comply to a SANS or similar International Quality Standard

9. Must slings be colour coded?

This is not a legal requirement but can be stipulated in a company SOP. It is important to note that a sling is not always safe to use, simply because it is colour coded, and operators should be trained accordingly.
Proper charts must be placed in the work place etc. The practice of using paint is no longer recommended as repeated coats of paint can cover defects. Furthermore, paint is messy, does not last and can be confusing when different colors are applied on a component. Cable ties, polyurethane or colored washers etc can also be used.

10. **Must sling hooks be fitted with safety latches?**
This is also not a legal requirement but, once again can be insisted upon in a company SOP. Certain hooks, such as foundry hooks and grab hooks are not designed to be fitted with latches and these hooks fully comply with International quality Standards such as EN 1677. Note that top and bottom hooks fitted to chain blocks and lever hoists must be fitted with latches, as required in SANS 1594 and SANS 1636. Even crane hooks do not have to be fitted with latches as DMR 18.4 specifies that hooks shall be so designed “to prevent accidental disconnection of the load under working conditions cannot take place”.

11. **Must sling and hoist hooks be pop marked?**
This practice is also not a legal requirement for sling hooks but recommended for crane hooks. Sling hooks can be damaged as a result of incorrect methods of marking and the manufacturer will dispute any subsequent claim for damage etc. See OHSA Section 15 “duty not to interfere with or damage….”
The relevant SANS for chain blocks and lever hoists specify that the OEM “shall supply a means or information for the user to determine if the hook throat opening is in excess of the OEMs specification”
This “means or information” can be in the form of marks on the hooks applied by the manufacture (not the user) or the dimensions can be specified in the operating manual which must be supplied with the hoist.
Any hoist that carries a CE mark must be supplied with an EU Declaration of Conformity, a Test Certificate as well as an operating manual and be branded according to CE requirements. The manual will specify hook throat openings.

12. **What marking should be on Shackles?**
Shackles do not have to be marked with an individual number. Shackles should be marked with the WLL, the size as well as a traceable OEM symbol or brand name and a batch compliance number or mark. Most shackles are marked in imperial sizes such as 5/8 or 3/4, as most shackles comply with US Federal Specs which are not in metric sizes. Shackles could also be stamped with a number of the corresponding supplier’s certificate, but this is not a legal requirement.
Once again, if the shackle fails, a supplier can dispute that they supplied the particular shackle, unless the shackle can be traced back to them. The Supplier must have traceability back to his supplier.
13. **WLL versus SWL**

These terms are often confused and there is a difference. The **WLL** is the maximum load to be lifted, lowered or suspended by a hoist or sling as specified by the OEM. The WLL is clearly marked on the hoist or sling tag and is based on the design factor (FOS) and must never be exceeded. All LT and hoists must be manufactured to a Standard and all Standards specify that hoists and sling be marked with the WLL, and not the SWL.

The **SWL** can be the same or less than the WLL and depends on operational conditions. To name a few examples:

- The SWL of a sling reduces as the angle increases between the sling legs
- If chain is used to lift hot loads, the SWL reduces as the chain temperature increases. For example the SWL of Grade 80 alloy chain at 400°C is 25% less than the rated WLL.
- If shackles are used at angles the SWL reduces accordingly (at 90° less 50%)
- The SWL of a sling or hoist can be reduced by the User, depending on the conditions under which the sling or hoist is used. This new safe load is then the SWL and not the original WLL.

This reduced OEM WLL is then specified as the SWL. Beams are marked SWL as the designers had to calculate what the beam can lift safely.

Lastly there are many grey areas in both the OHSA and MHSA and discretion and best practice must be adhered to. To always say it is a legal requirement is incorrect if the law is not clear. SOPs must specify all lifting equipment requirements, particular to the User’s specific operation.

To conclude, it must be stressed that the above information supplied is the writer’s opinion only and should not be construed as legal advice or legally binding, but as a guide to promote lifting equipment safety in the work place.

Phakamisa Safety Consultants assist to compile customized SOPs and provide LTI as well as management training to assist the user to be legally compliant and comply with a Total Safe Lifting Program in the work place.

Compiled by Piet Otto                Date 01.04.2015
Mobile: 082 372 4595     or        potto@icon.co.za.