



Permanent anchorage systems on rope access and fall arrest systems

Information and advice for designers, installers, testers and users

DEPARTMENT OF LABOUR ADVICE

1. An appropriate Chartered Professional Engineer (CPEng) should be involved in the **system design** to ensure a proper structural assessment and sound engineering practices are applied.
2. The completed installation must be **assessed and certified by a CPEng**.
3. It is critical that **examination and re-certification** be carried out in accordance with the relevant Standards and/or the Manufacturers'/Designers published instructions.
4. Proof loading of the anchorages should not occur unless **the tester is able to validate the design's ultimate load**.
5. If documentation verifying ultimate loadings and the involvement of a CPEng in the design process are not available, the system must be examined by a CPEng before continued use or re-certification.

BACKGROUND

Following a complaint about the safety of permanent rope access anchorages the Department of Labour has published an Alert. Further investigation has revealed problems in some specific areas of these systems.

Work is being undertaken, in conjunction with the Industrial Rope Access Association of New Zealand and others, to update guidance material but as the publication of this may be some time away it is necessary to provide some interim advice about the issues identified.

The Australian Rope Access Association publishes a document titled ARAA Code- Permanent Anchors for Rope Access Use. This is available at www.araa.net.au. It is intended that, if possible, significant parts of this document be incorporated into or referred to in future Guidance documents published in New Zealand.

This advice draws on the framework in that document. Each of the following parts of the overall system must be implemented correctly to provide assurance that the system will perform correctly when required.

DESIGN OF SYSTEMS

This includes System Layout, Structural Assessment of Structure and Product Design/Manufacturers

AS/NZ 1891:2009 and AS/NZ 4488:1997 and the ARAA document provide advice on the above topics. Published information from suppliers and manufacturers will provide detail of the performance of their specific systems. Environmental factors in general and factors that are specific to the installation site need to be considered when design and selecting rope access systems.

It is the Department's view that, to ensure a proper structural assessment and sound engineering practices are applied to the system design, involvement from an appropriate Chartered Professional Engineer (CPEng) is required at this phase.

The design phase requires collaboration between rope access experts and engineers. Both parties bring specific skills that are needed so the systems are designed to be safe and useable.

Through-drilled anchor systems must be the first preference of the designer wherever structural and on-going access considerations permit. The use of friction "mechanical" anchors should be carefully weighed against the risks of possible corrosion over time.

INSTALLATION

This involves following the system layout and structural design, using the methods and products specified and carrying out the work competently.

Before installing any system it is important to check that the design process has involved both a CPEng and rope access specialist.

It is critical that products and systems are installed according to the published specifications of the manufacturer. Specified drill bit diameters and minimum embedment depths must be strictly adhered to. Reduction of the embedment depth of mechanical and chemical anchors significantly affects both their tensile and shear performance. On site modifications that are contrary to published specifications such as shortening of bolts are not permitted.

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In respect of friction and chemical anchorages all specifications must be followed including proper cleaning of drilled holes, proof loading and specified torquing of fixings. It is important that screwed-on eye nuts are fitted so that their shoulder abuts the surface to which they are mounted. Eye nuts must be fitted sufficiently tightly that they cannot be undone by hand; however, over-tightening must be avoided as this may inadvertently stress the anchor assembly. There must be sufficient thread engagement through the nut in accordance with the manufacturer's specifications.

Chemical anchorages in particular need to be installed correctly. Voids have been found in the resin in a number of anchorages recently tested and anchorages have moved or pulled out when tested.

The completed installation must be assessed and certified by a CPEng. This certification shall include:

1. A clear statement of the design standard(s) referenced
2. Details of the design rating of all anchors certified including the anchor type (through-bolt, chemical anchor, friction anchor etc.)
3. A schematic drawing showing the layout and location of the anchors certified, identifying those of different ratings if applicable.
4. Any special conditions regarding on-going inspection and re-certification.

EXAMINATION AND RE-CERTIFICATION

Periodic Examination of Rope Access and Fall Arrest Systems

Permanent Rope access and fall arrest systems are usually exposed to a harsh environment and regular examination of the total system is an important part of ensuring performance.

AS/NZ 1891.4.9:2009 and AS/NZ 4488.2.7:1997 both specify that components of the systems be inspected on a regular and periodic interval. In particular permanently installed anchorages are singled out in the Standards for attention.

It is critical that such examinations are carried out in accordance with the Standards and/or the Manufacturers/Designers instructions.

One component of the above examination is the proof loading of friction anchors. It is clear that some companies testers are applying proof loading without consideration of the design loadings of the anchorage systems as specific in AS/NZ 1891.4:2009 or AS/NZ 4488.2:1997 or the designer.

It is the Department's view that proof loading of these anchorages should not occur unless the tester is able to validate the ultimate load that the anchorages were designed for. Axial proof loading greater than 50% of the design criteria (as required by the relevant Standards) is likely to weaken or reduce the design life of the anchorages.

The equipment used to carry out the "pull testing" must be calibrated to ensure the results are credible. The calibration must be carried out by a company who is International Accredited New Zealand (IANZ) accredited for that calibration. The calibration certificate must accompany the testing equipment and personnel must be trained in its interpretation.

Persons carrying out "pull testing" need consider the effect of deflection of the substrate when carried out the axial proof loading. The deflection can sometimes give a false reading.

The current investigation has found wide variation to the tagging of anchors as outlined in AS/NZ 4488.2. Attention is drawn to the need to permanently identify all anchors not rated for fall arrest and the need for proper signage.

It is also the Department's view that if documentation is not available to be able to verify the ultimate loadings of components of the system and the involvement of a CPEng in the design process then such a person must consulted before continued use or re-certification. It may be that another system needs to be installed.

Note: This material has been prepared using the best information available to the Department of Labour at the time of publication. Information may change over time and it may be necessary for you to obtain an update. This material is also only intended to provide general advice and does not constitute legal advice. You should make your own judgement about action you may need to take to ensure you have complied with your workplace health and safety obligations under the law.

