

INSTITUTE FOR WORK AT HEIGHT



Good Practice Note

2019

Good Practice notes inform the industry on how to embrace best practice and how to deal with issues that may arise. They are aligned with, but do not replace regulation as well as endorse industry standards

Safety Cages on Fixed Ladders

Concern:

It has long been argued that if a caged ladder 'complies' with the relevant building codes / regulations, and if an employee were to then slip and fall from the 'compliant' ladder, the employer would be safe from any litigation. But this might not be true.

It is the responsibility of any employer to provide a safe working environment for their employees, (and other persons) which includes those who climb ladders. Their ultimate responsibility is the safety of their employees and not just complying with a rule or guideline about ladder design.

The courts may take compliance into consideration but, in situations like this, where available technology has developed quicker than the industry rules, the point will be made that the technology was available to protect the employee and that their protection is a more important obligation than legal compliance.

It all comes back to this single crucial rule - the employer must provide a safe workplace. Read sections 8 and 9 of the Occupational Health and Safety Act.

Providing cages around a ladder does not, in itself, convert the ladder into either a safe workplace or a safe method of access. In fact, it has been reported internationally that the safety cage around a ladder can cause serious, life-threatening injuries to a person that falls whilst inside the cage.

“Real fall protection”

For a person climbing a fixed ladder, there are only two systems that will genuinely provide fall protection:

1. Provide an inertia reel fall arrest block that is fixed to a suitable anchorage point at the top of the structure and connect this to the person's harness; or
2. Provide a guided fall arrest system (cable or rail based) that is permanently fixed to the ladder.

Legal References:

OSHA of the USA

The occupational health and safety administration of the United States of America has released a revision to their “Walking, working surface standard” # CFR 1910 at the end of 2016. It requires that safety cages be replaced with fall protection / ladder safety systems and sets the following time line: -

- From Jan 2017 fall protection systems must be fitted to fixed ladders taller than 24 Feet i.e. $\pm 7,3\text{m}$
- Safety cages are no longer considered compliant fall protection on new fixed ladders as of 19 November 2018.
- Fall protection systems will be used to replace damaged or non-functioning safety cages on fixed ladders.
{This stipulation will thus phase out safety cages over an extended period so that by}:
- 19 November 2036 no safety cage may be fitted on fixed ladders.

United Kingdom's HSE

HSE commissioned a project to investigate the use of fall protection systems in combination with safety caged fixed ladders.

This research report {#657 of August 2012} recommends the removal of safety hoops in favour of fall protection systems however, the HSE made the following statement w.r.t this recommendation:

*"HSE does not recommend the blanket removal of hoops from ladders (which would probably increase overall risk), or to prohibit the use of personal fall arrest systems within hooped ladders. While the report concludes that hoops alone do not provide positive fall arrest capability, **they can provide other safety benefits such as getting on and off the ladder that the report does not explore.**"* (my emphasis)

South Africa - General Safety Regulations

Fixed ladders are addressed in Regulation 13A (6) which states: -

An employer shall ensure that a fixed ladder which exceeds 5m in length and is attached to a vertical structure with an inclination to the horizontal level of 75° or more -

- a) has its rungs at least 150 mm away from the structure to which the ladder is attached; and*
- b) is provided with a cage which -*
 - i) extends from a point not exceeding 2.5 m from the lower level to a height of at least 900 mm above the top level served by the ladder; and*
 - ii) shall afford firm support along its whole length for the back of the person climbing the ladder, and for which purpose no part of the cage shall be more than 700 mm away from the level of the rungs:*

Provided that the foregoing provisions of paragraph (b) shall not apply if platforms, which are spaced not more than 8 m apart and suitable for persons to rest on, are provided.

It is the proviso at the end of the regulation that is important. According to it, provided that there is a "resting platform" at least every 8m of vertical climbing height, the safety cage can be omitted. These regulations are 33 years old and were written in an era long before personal fall arrest systems (PPE)

became mandatory for working at heights. Modern fall arrest technology is freely available and must be considered as the “reasonably practicable” alternative to full height cages but keeping in mind HSE’s comment regarding the complete removal of the cages.

After further investigation it became clear that HSE’s concerns were very real and that a composite system would best address fall risks. Refer to Figures 1 and 2 below.

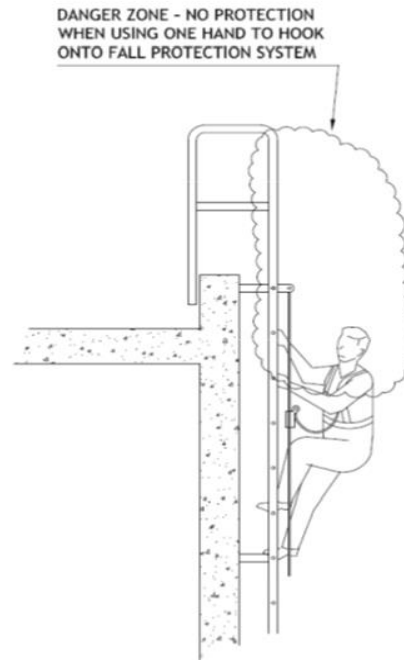


FIGURE 1 – FALL ARREST SYSTEM ON FIXED LADDERS BUT UNSAFE AT THE TOP

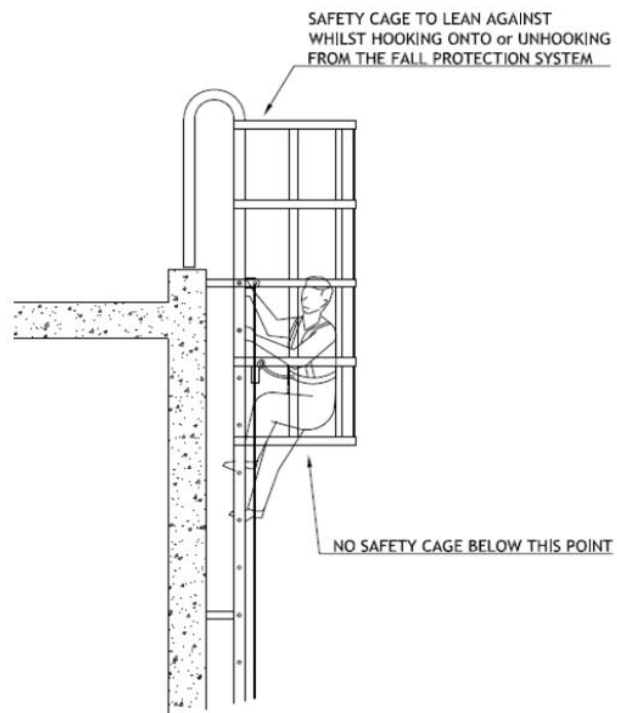


FIGURE 2 COMPOSITE FALL PROTECTION ON FIXED LADDERS

Contact Us

Company Name

Institute for Work at
Height

Street Address

Second Floor,
Helvetia House,
80 Greenvale Road,
Wilbert,
1401

Phone

+27(0)11 - 450 - 1804

Email

info@ifwh.co.za

Website

www.profbod.co.za

Recommendation:

Therefore, it is proposed that a recommendation be made to the Chief Inspector of Department of Labour to revise General Safety Regulations 13A (6) to require that in all cases, any fixed ladder higher than 3,5 m be fitted with a personal fall protection system and that all such ladders be equipped with a "transition safety cage" at its upper end.

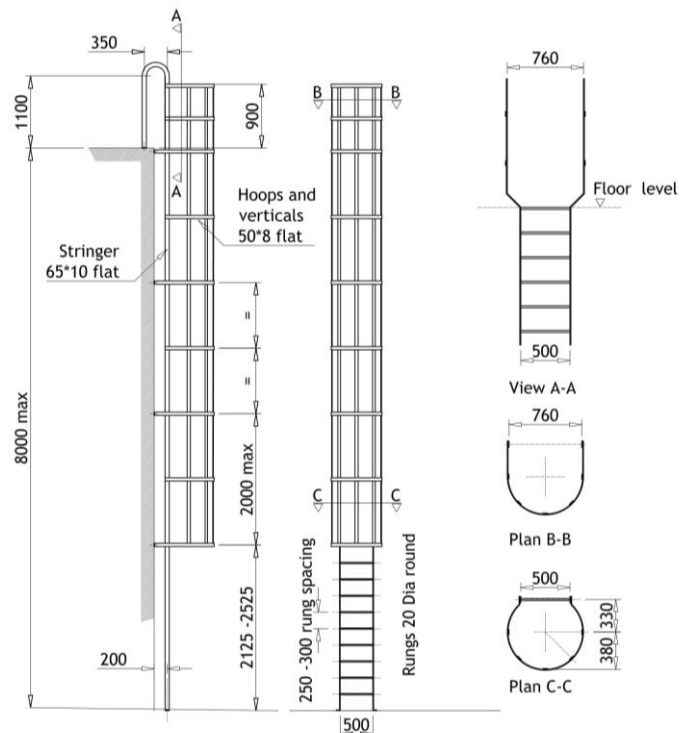
South African steel construction handbook (the Red book) stipulates the following requirements for ladders, which is not covered by GSR 13(A);

Slopes, dimensions, and clearance

Ladders should preferably not rise more than 9 m (Clause C13(3) of the Machinery and Occupational Safety Act) without provision of an intermediate platform. Intermediate platforms should break the line of the ladder or otherwise be placed alongside the ladder. Platforms should be at least 840 mm square and be guarded by handrails and kick plates.

"The clear width between stringers should be between 450 mm and 500 mm. The narrower width is sufficient for normal use. Where the ladder gives access to a platform from the outside of the platform, the stringers should be opened out above the platform to give a clear width of at least 610 mm to provide sufficient width for the user to turn to face the ladder before descending.

The foot room clearance at the back of the ladder must be least 150 mm. the clearance on the user's side of a ladder not fitted with a safety cage, measured perpendicular to the stringers, should not be less than 760 mm for vertical ladders or 1,000 mm for sloping ladders.



Details of vertical ladder

Stingers

Stringers may be made from flat bars not less than 65 mm x 10 mm, or from angles in the case of larger unsupported heights. They should be in one continuous length wherever possible, but where joints are necessary the fishplates should be located on the inside of the stringers. If bolted, the bolts should have been countersunk or cup heads on the outside.

It is important that stingers be adequately and firmly attached to the supporting structure at suitable intervals. Where the stingers are opened out above platform level they should be bent over and connected to the platform handrail standards.

Rungs

Rungs may be made from round bar with a diameter of not less than 20 mm. the pitch should be between 250 mm and 300 mm. rungs may be attached directly to the stringer inner faces by welding or the stringers may be drilled to receive the rungs, the rung ends being set in from the outer faces and welded.

The top rung of a ladder should be at the same level as the floor or landing at the head of the ladder. Alternatively, it may be located at up to 100 mm below this level, provided there is at least 200 mm toe clearance behind the rung. The space between the latter and the edge of the platform may be filled in with a threshold plate with a stiffened edge, which would then replace the top rung.

Where a ladder gives access to a platform through a hole in the flooring, the top rung should be level with or slightly lower than the platform and the stringers should be carried up above floor level, without change of slope, to the height of the handrail around the hole. Additional rungs, at the regular pitch, may be provided within this additional height to act as handholds.

Safety Cages

Ladders with a height of more than 5 m must be fitted with safety cages comprising hoops at a uniform spacing of not more than 1,000 mm and three or more vertical straps. Cages should be attached so as to support their own weight and that of the user. The connection to the straps to the hoops and the hoops to the stringers is invariably by means of welding. Where bolts are used these should be countersunk or otherwise recessed so as not to cause obstruction within the cage.

Recommended sizes and required clearance for cages are as follows:

Hoops and Straps	50 mm x 8 mm
Width inside hoops	70 mm x 760 mm
Back clearance inside hoops, maximum	700 mm = vertical ladders 840 mm = sloping ladders
Height from lower floor to underside of cage, maximum	2,5 m
Extension of cage above upper floor, maximum	900 mm

Important Notice:

Without this “transition safety cage” the person is seriously exposed to a fall risk when using one had to hook onto the safety line

Note of thanks:

The Institute for Work at Height would like to thank Riggers Steeplejacks for this article and the valuable information supplied.