

TOOL FALL PROTECTION WHEN WORKING AT HEIGHTS

A HANDBOOK THAT HELPS YOU PREVENT
ACCIDENTS AND SAVE LIVES



Luna
TOOLS

“WE MUST MAKE SURE THAT OUR WORKPLACES ARE SAFE”



Almost every week there is a fatal accident at a Swedish workplace. In order to reduce the number of work-related accidents the government has decided to focus on the prevention of accidents with the goal to reduce the number of fatal accidents to zero. To reach this goal concrete measures are needed - one of these is the use of tool fall protection when working at heights.

Unfortunately, the use of tool fall protection is a rather rare sight at most Swedish building- and construction sites. This negligence puts both yours and your colleagues' lives at stake. Falling objects is a risk that is often underestimated. Results from our own survey showed that one third of all professional craftsmen don't know how to secure their tools. That's why we at Luna have chosen to write this handbook, to inform you of the risks and negative consequences of falling objects and how you can minimize the risk for accidents and injuries related to falling objects at your workplace.

The slightest mistake can lead to material damages, personal injury or in the worst case scenario even loss of life. We can all make mistakes, but some mistakes should never occur. With help of this handbook we shall strive for safer building- and construction sites in the future - and take a step closer towards the goal of zero work-related fatal accidents.

OSCAR FREDELL
CEO
LUNA GROUP



**DURING THE PERIOD 2014–2018 5,000
WORK-RELATED ACCIDENTS IN SWEDEN
WERE CAUSED BY FALLING OBJECTS.**

Source: Arbetsmiljöverket (The Swedish Work Environment Authority)

”The Swedish Work Environment Authority’s “Zero Accident vision” is based on the Government’s work environment strategy to focus on the prevention of accidents with the goal to reduce the number of fatal accidents to zero. It is a social assignment that requires a long-term commitment with a perspective of 5-10 years which shall contribute to that no one get sick, injured or die as a result of work-related accidents”.

Source: Arbetsmiljöverket (The Swedish Work Environment Authority)

TABLE OF CONTENTS

6. **FALLING OBJECTS MAY KILL**
8. **EVEN SMALL OBJECTS CAN CAUSE GREAT INJURY**
12. **INTERVIEW WITH KLAS ÄLVERBRANDT,
SITE MANAGER AT FRISTAD BYGG**
14. **COMMON CAUSES FOR DROPPED TOOLS**
16. **CONSEQUENCES OF DROPPED OBJECTS FROM HEIGHTS**
18. **INTERVIEW WITH ODD EINAR HAUGAN,
SENIOR TECHNICIAN AT KVERNERN**
20. **PREVENTIVE MEASURES ACCORDING TO THE
HIERARCHY OF CONTROL**
22. **EFFECTIVE PROACTIVE MEASURES TO PREVENT
INJURIES DUE TO FALLING OBJECTS**
24. **INTERVIEW WITH JOHAN VIKLUND AND DAG KNUTSSON,
FOUNDERS OF NORD ACCESS**
26. **TOOL FALL PROTECTION – THREE EASY STEPS**
28. **INTERVIEW WITH ROBERT NORDSTRAND,
MECHANICAL MAINTENANCE ENGINEER AT RINGHALS
NUCLEAR POWER PLANT**
30. **WHY YOU SHOULD CHOOSE LUNA TOOLS TO SECURE
YOUR HAND TOOLS**

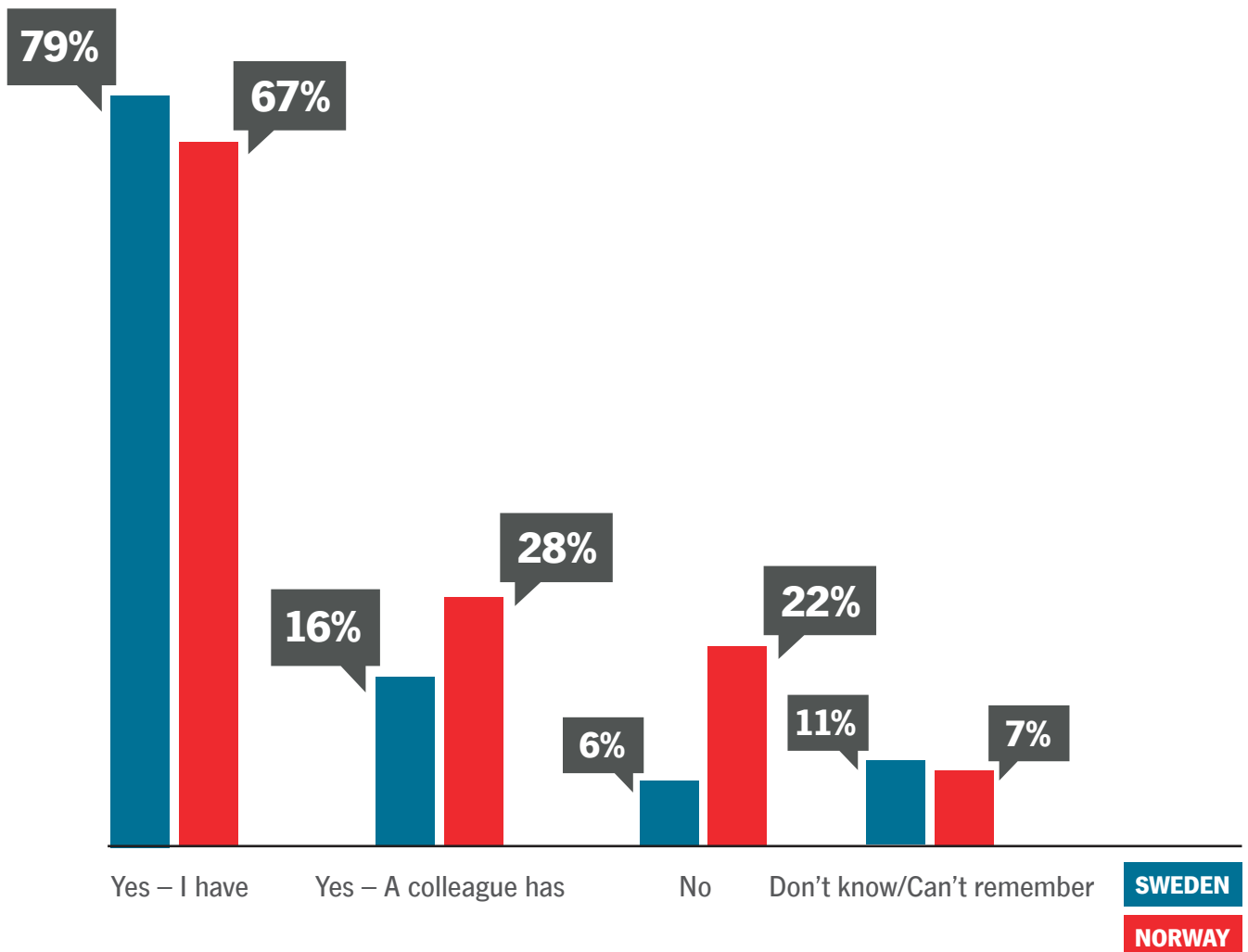


FALLING OBJECTS CAN KILL

International studies show that dropped objects from heights are one of the most common causes of personal injury and death. According to The Occupational Safety and Health Administration (OSHA) 50,000 people are injured every year by falling objects at US building- and construction sites. Both in the UK (Source: HSE's Riddor Report) and in Sweden (Source: The Swedish Work Environment Authority) falling objects are one of the three most common causes of death in the workplace.

According to the Swedish Work Environment Authority's statistics, approximately 5,000 work accidents in Sweden related to falling objects were reported during the period 2014–2018. 18 people lost their lives because of falling objects during the same period.

HAVE YOU OR ANY OF YOUR COLLEAGUES DROPPED A TOOL FROM A HEIGHT OVER TWO METERS?



According to a survey made in June 2019, 79 percent of the professional craftsmen in Sweden answered that they on one or more occasion have dropped a tool from two meters or higher. In Norway this figure was 67 percent. The survey included 206 craftsmen in Sweden and Norway and was carried out by Solvera, on behalf of Luna Tools.

DID YOU KNOW?



18 PERSONS DIED DUE TO
FALLING OBJECTS IN SWEDEN
DURING THE PERIOD 2014-2018.

Source: The Swedish Work Environment Authority

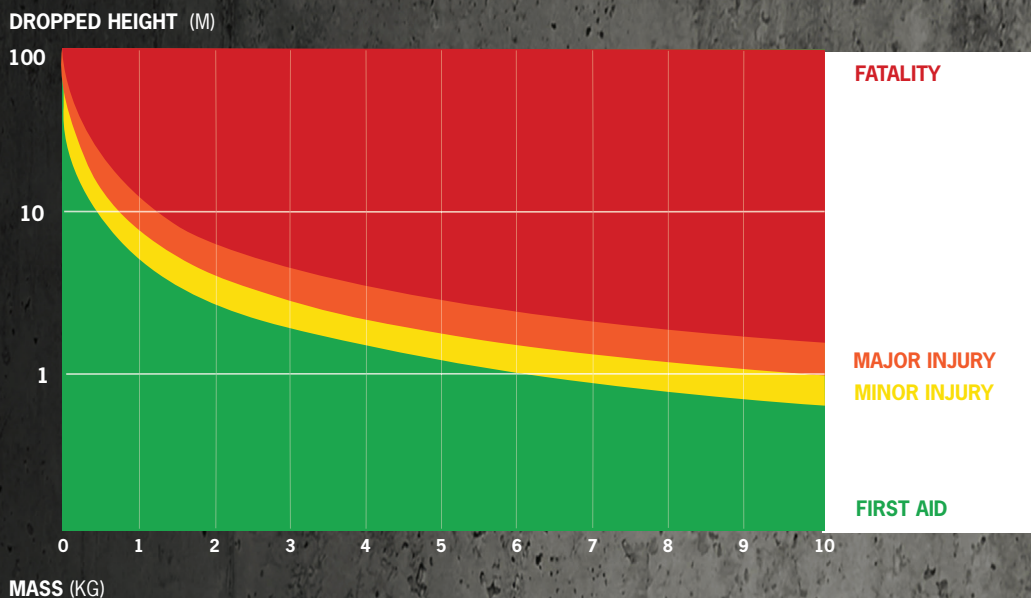
EVEN SMALL OBJECTS CAN CAUSE GREAT INJURY

Many people do not realize the magnitude of the force that is generated when a tool is dropped from height. Even with some form of protection, the result of the impact can become devastating, despite if the weight of the object is low. For example, an object weighing less than 100 grams can lead to catastrophic consequences if it falls from a high altitude.

The object can reach a velocity resulting in tremendous impact force. If the object hits a person, it can easily cut through the skin and damage tissue and internal organs.

WHEN DOES A FALLING OBJECT BECOME DEADLY?

The diagram shows the correlation between the weight of an object, the fall height and which damage the object can cause.



- The wearing of standard personal protective equipment (PPE), eg hard hat and safety boots is assumed in the diagram.
- The diagram is only an indication of the possible damage.
- The calculation assumes a blunt object. It is not compatible with broken glass, metal shards etc.

A 2 KG TOOL DROPPED FROM 5 METERS



EQUIVALENT TO THE IMPACT OF AN ELEPHANT

A 2 KG TOOL DROPPED FROM 20 METERS



EQUIVALENT TO THE IMPACT OF A SMALLER BUS

A high-speed photograph capturing a hammer's impact on a metal pipe. The hammer, with a wooden handle and a black head, is shown in three sequential positions as it falls from the top left towards the bottom center. At the point of impact, a bright burst of orange sparks is visible, and the hammer head is deflected to the right. The background is a dark, textured concrete wall. Two callout lines with white dots point to the hammer's position before and after impact.


1 A TOOL FALLS FROM 37 METERS

2 THE TOOL IS DEFLECTED AT FIRST POINT OF IMPACT

THE DEFLECTED OBJECT - A DEADLY PROJECTILE

The force of gravity does everything it can to get dropped objects to fall vertically. But dropped items often have obstacles in its vertical path, which causes it to ricochet in different directions. Factors like speed, the shape of the object and the angle and shape of the place of impact

determine the change of direction for the falling object. This can transform the dropped object into a dangerous projectile. If people are located near the place of first impact the object can cause serious or even fatal injuries.



3 THE TOOL BECOMES A DEADLY PROJECTILE THAT CAN LAND AS FAR AWAY AS 65 METERS FROM THE FIRST POINT OF IMPACT

“FOR ME, IT IS IMPORTANT THAT SAFETY EQUIPMENT IS EASILY ACCESSIBLE”

Klas Älverbrandt, Site Manager at Fristad Bygg, has worked within the construction industry for many years. Nowadays workplace safety is a big part of his responsibilities. He believes that many work-related accidents at building- and construction sites in Sweden could easily have been avoided with the right knowledge.



The construction company Fristad Bygg, with its main office in the small town of Fristad outside Borås, has many successful construction projects in their portfolio. They work with both constructions and renovations of residential housing, commercial real estate, schools, health care and cultural buildings. Klas Älverbrandt is Site Manager at the company and works daily with workplace safety.

– As a Site Manager, I have the ultimate responsibility for the safety at the site, and at Fristad Bygg safety always has the highest priority. Many unnecessary accidents happen at building- and construction sites in Sweden that easily could have been avoided with education and the right knowledge, says Klas Älverbrandt.

When it comes to safety, Fristad Bygg work with the fundamental requirements like helmet with hearing protection and safety shoes. This is complemented with eye protection, clothing and gloves for work requiring additional personal safety equipment. For work high above ground (2 meters and higher) fall protection equipment is a priority, like securing individual tools from falling and collective protection such as railings.

– Tool fall protection is something we see as very important and we are in the process of implementing it further to make it a natural and obvious part of all work that is done high above ground. The consequences of dropping a hammer can be devastating. Someone below can get seriously hurt. This is a common risk since we often work in high storey buildings. An even more common risk is that a dropped tool can damage material and already finished constructions below.

At Fristad Bygg they have both a Senior Safety Representative as well as Local Safety Representative on the different building- and construction sites. They make regular inspections of the sites and the employees to make sure all regulations are being followed.

– Safety Representative are entitled to shut down the workplace should we not live up to the rules and regulations. For me, it is important that safety equipment is easily accessible. Equally important is to ensure the right level of competence among our employees and that we regularly practice how to use and work with the safety equipment, says Klas Älverbrandt.

For work on scaffolding and other risky jobs it is a requirement for our employees to take a safety course. To raise the safety level further, Fristad Bygg are continuously working on establishing and maintaining a strong safety culture in the workplace.

– It can be simple things like reminding each other to bring their safety equipment. We also plan our work in a

way that safety is prioritized. This must be a natural part of the everyday work within the construction industry, says Klas Älverbrandt.

Fristad Bygg often work in multi-storey buildings. Therefore, it is important for the workers to be aware of the risks. However, there have been situations when the safety protocol has not been followed properly.

– I remember when I once dropped a tool that damaged a tile floor. It was both expensive and took us several hours to fix. It's not one of my proudest moments as a Site Manager and it could easily have been avoided had I only secured the tool, says Klas Älverbrandt.



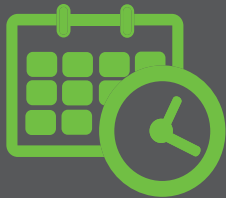
KLAS ÄLVERBRANDT
SITE MANAGER
FRISTAD BYGG

COMMON CAUSES FOR DROPPED TOOLS



INADEQUATE RISK ASSESSMENT

A well conducted risk assessment identifies potential risks for falling objects and raises awareness of the possible dangers that are present. This means that you can proactively take actions to minimize risks.



INADEQUATE PROCEDURES

Clear rules and procedures for risk minimization of falling objects when working at heights also help to raise awareness and strengthen the safety culture in a workplace. That, in turn, can reduce the number of dropped objects.



LACK OF KNOWLEDGE

Education and training are needed to raise awareness of the catastrophic consequences dropped objects can lead to. With more knowledge the desire to proactively prevent the risks of falling objects will increase.



TOOLS USED WITHOUT TOOL FALL PROTECTION

Hand tools and power tools are examples of equipment that can cause a lot of damage if dropped from heights and should therefore be secured. Only eleven percent of all craftsmen say that they always secure their tools when working at heights*.



POOR HOUSEKEEPING

Left behind tools and objects that are scattered all over the place can pose unexpected risks for other workers. To keep the workplace tidy and tools organized minimizes this type of risk.

*Based on 206 telephone interviews with craftsmen in Sweden and Norway in June 2019. The survey was conducted by Solvero.

61%

**PREFER TOOLS THAT
ARE DESIGNED FOR EASY
TOOL FALL PROTECTION**

* Based on 206 telephone interviews with craftsmen in Sweden and Norway in June 2019. The survey was conducted by Solvero.



HUMAN FACTOR

Almost half of all dropped objects are due to the human factor. Stress, carelessness, neglect and complacency are examples of behaviours that can result in dropped tools and other objects.



ENVIRONMENTAL FACTORS

Low temperature, wind, rain, ice, snow and other extreme weather conditions are also contributing factors that increases the risk of losing control of tools and other objects.

CONSEQUENCES OF DROPPED OBJECTS FROM HEIGHTS

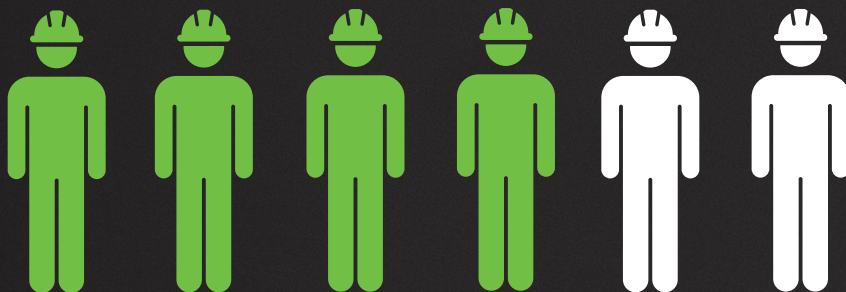


PERSONAL INJURIES/ FATALITIES

Dropped objects from heights can in worst case lead to fatal accidents and it can also cause permanent injuries and handicaps. The trauma inflicted on the individual, the individual's family and colleagues can be devastating. It is not only the construction workers who are at risk, falling objects can also hit other people that are passing by. Even if barriers and fenced-off areas follow the regulations, a falling object can bounce off a roof, scaffolding or similar and cause damages outside the construction site.

DROPPED OBJECTS IS THE THIRD MOST COMMON CAUSE FOR INJURIES AND DEATHS IN THE OIL AND GAS INDUSTRY.

Source: DROPS



TWO THIRDS (68%) OF NORWEIGAN CRAFTSMEN SAY THAT THEY LOSE TIME WHEN THEY DROP TOOLS FROM HEIGHTS.

TIME

Dropping objects from heights can have large implications for work efficiency. To retrieve a dropped tool from a height can be very time-consuming, especially when personal fall protection equipment needs to be taken off and on. If a dropped tool breaks or is lost, the work at the site can come to a complete stop until the tool has been replaced. If the tool is dropped on e.g. a newly installed floor or countertop it can take several days to restore the damage.



MONEY

To replace tools, damaged material or installations, such as flooring, can be very expensive. Besides the cost of lost time, the cost for purchasing replacement materials can also constitute a significant expense. In case of personal injury or loss of life, there can also be costs to compensate injured personnel, hire replacement personnel and possibly medical costs. The cost in badwill for a company in the event of a personal injury or a fatal accident can greatly affect a company's reputation.



1 OF 5 SWEDISH CRAFTSMEN (18%) STATE THAT DAMAGE TO FLOORS, ROOFS AND OTHER MATERIALS HAS OCCURRED ON ONE OR MORE OCCASIONS AS A CONSEQUENCE OF A DROPPED TOOL.

“IN A WORST-CASE SCENARIO SOMEONE MAY LOSE THEIR LIFE”

Odd Einar Haugan is Senior Technician at the Norwegian offshore group Kvaerner and is responsible for the quality level of the tool fall protection equipment. He has good knowledge about the risks of falling objects on construction sites. Tool fall protection has since long been an important part of his everyday work and is given high priority in the work process.

Kvaerner was founded as early as 1853 and today has approximately 2,700 employees. They provide engineering, procurement and construction services and deliver advanced offshore platforms, onshore plants, floating production

units and renewable energy solutions. In addition, Kvaerner is considered a good example of a company that has come far in their safety work.

– We want to be the best in the industry so that everyone can work safely. It is also something that makes us more attractive as an employer. Therefore, it is important to have good contacts with our suppliers, so we, among other things, get the help we need to secure our tools, says Odd Einar Haugan.

After many years of dedicated safety focus, Kvaerner has seen that incidents have been reduced in their workplaces. Above all, with the help of tool fall protection, the number of falling objects has decreased significantly. In addition, they always fence off areas below when work is conducted at heights.



– We have to do this. Neglecting tool fall protection and absence of fenced off areas can, at best, lead to a shallow wound should a person get hit. But since we are working at heights up to 40 meters, someone can lose their life in a worst-case scenario, says Odd Einar Haugan.

He also says that they focus heavily on internal rules in the workplace. They carry out safety rounds once a week to investigate potential threats. Implementing this is the responsibility of the Head of Safety. To further improve the safety, it is a requirement that all employees attend a safety course.

– During the one-day safety course, all employees have to go through the requirements for operations here at Kvaerner. We inform about all rules which applies to maintain safety. We also go through all the equipment like gloves, shoes and helmets, says Odd Einar Haugan.

The learning does not end there. Kvaerner continuously train their employees about safety requirements and the importance of tool fall protection, among other things. In addition, a risk analysis is performed in the working groups before work at heights begin.

– If we get a water leakage out on the floor it may freeze to ice. Therefore, we must be careful in the safety work and work strategically when it comes to scaffolding, railings, signs and tarpaulins, says Odd Einar Haugan.

Kvaerner’s cooperation with their suppliers has been one of several key factors to maintain a safe workplace.

“Neglecting tool fall protection and absence of fenced off areas can, at best, lead to a shallow wound should a person get hit.”

– For us, most important is that we have products that last over time and that we continue to have a good dialogue with our suppliers, concludes Odd Einar Haugan.



ODD EINAR HAUGAN
SENIOR TECHNICIAN
KVAERNER

PREVENTIVE MEASURES ACCORDING TO THE HIERARCHY OF CONTROL

The purpose of preventive measures is to reduce the likelihood of workplace accidents or work-related diseases. The safety measures should involve all workers (collective measures). Individual measures should be considered an option if collective measures are not feasible or effective.

Measures according to the Hierarchy of control for falling tools.

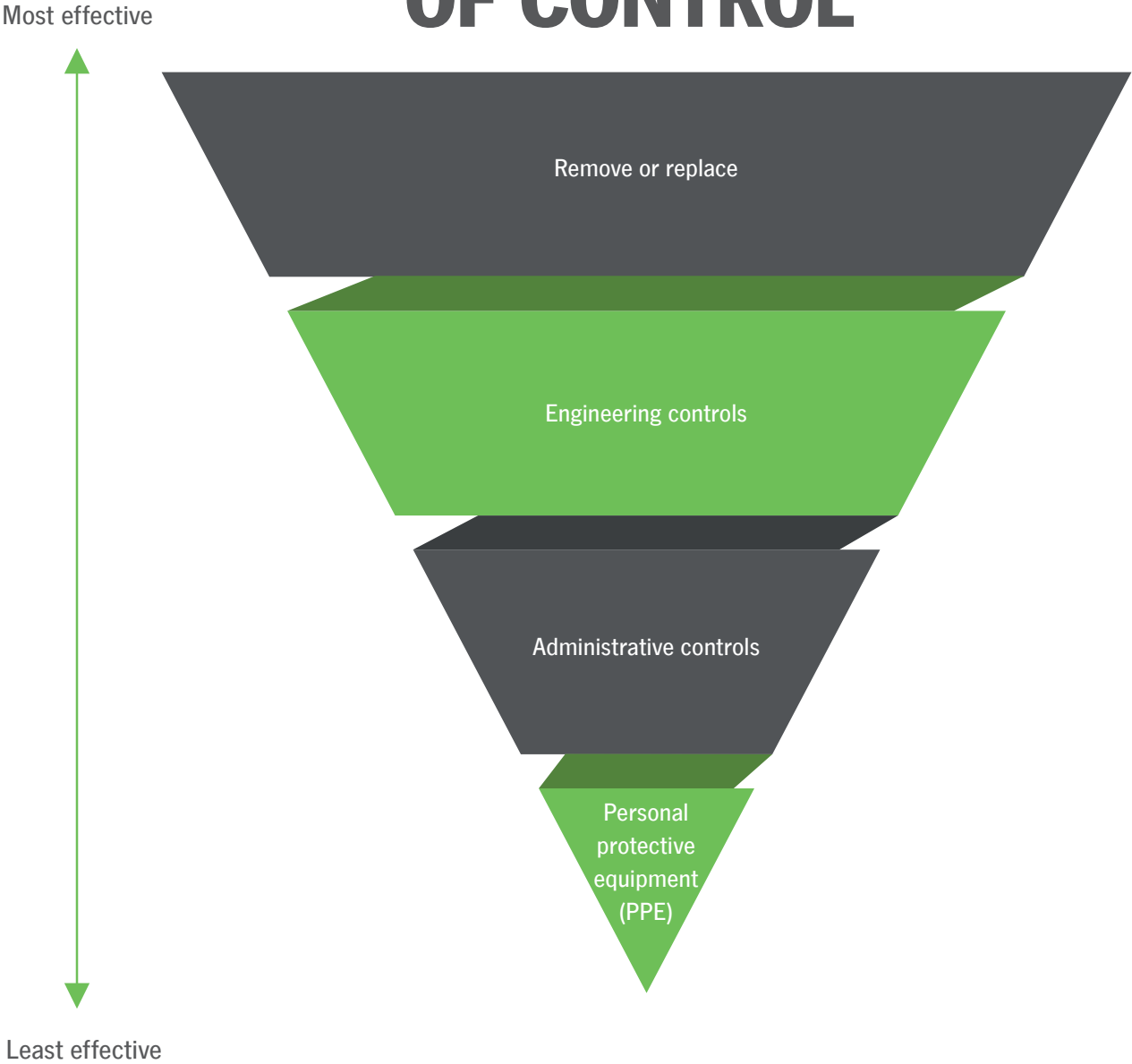
REMOVE OR REPLACE: It is often difficult to completely exclude the tools as they are usually required to do the job. However, there are a lot you can do to prevent risks, especially when working at heights. Replace tools that are difficult to secure with tools that are prepared for tool fall protection.

ENGINEERING CONTROLS: Make sure there are safety nets, floor barriers and that tools are correctly secured. It is also suggested that areas are fenced-off during specific periods when there is a higher risk of falling objects.

ADMINISTRATIVE CONTROLS: Make sure there are clear rules at the workplace to reduce the risk of falling objects. An important factor to achieve this is to increase the staff's awareness of the dangers of falling objects. It is also important to educate them on how tools are secured in a safe and correct way.

PERSONAL PROTECTION EQUIPMENT (PPE): Even if you work proactively with prevention of accidents, relevant personal protective equipment must always be worn to reduce or eliminate the consequences if the accident still occurs.

THE HIERARCHY OF CONTROL



Source: European Commission

EFFECTIVE PROACTIVE MEASURES TO PREVENT INJURIES DUE TO FALLING OBJECTS

TOOL FALL PROTECTION

Securing tools is an effective way to prevent tools from harming people or materials if dropped. An attachment component is connected to the tool. This, in turn, is connected to a lanyard or wire which is then anchored in the belt or to a fixed installation.



SAFETY BARRIERS

Safety barriers are an effective way to prevent accidents caused by dropped objects that are unsecured. Common examples are handrails, safety nets, floor barriers and fenced-off risk areas on the ground below.



EDUCATION AND REGULATIONS

To develop a safety culture, training and clear regulations are prerequisites. Important components are to create understanding and practical skills to be able to prevent risks. Other essential parts are to increase understanding, and awareness of the risks among workers and inform them of the consequences falling objects may cause.





53%

**WOULD LIKE GUIDANCE
HOW TO SECURE TOOLS**

*Based on 206 telephone interviews with craftsmen in Sweden and Norway in June 2019. The survey was conducted by Solvero.

“THE CONSEQUENCES OF A LOST OBJECT CAN BE HUGE SINCE WE SOMETIMES WORK AT HEIGHTS UP TO 300 METERS”

Johan Viklund and Dag Knutsson, the founders of Nord Access in Umeå, understand the importance of a safe workplace. They perform various services and are specialized in hard-to-reach places, tight spaces and heights. A normal day at work may include disassembly of a radio mast hanging from a helicopter, inspection of a wind turbine or hoisting themselves down into a mine shaft.

For Nord Access, security is paramount. All employees of the company are certified according to SPRAT, an international standard for working with rope access.

– Securing our tools is a foundation in everything we do in addition to securing ourselves. To some extent we do it for economic reasons, that is, not to waste time or damage material below us. The biggest reason, however, is not to hurt

anyone. The consequences of a dropped object can be huge since we sometimes work at heights up to 300 meters, says Johan Viklund.

– Planning the work before it starts is a prerequisite for high safety and productivity. To bring nothing but the



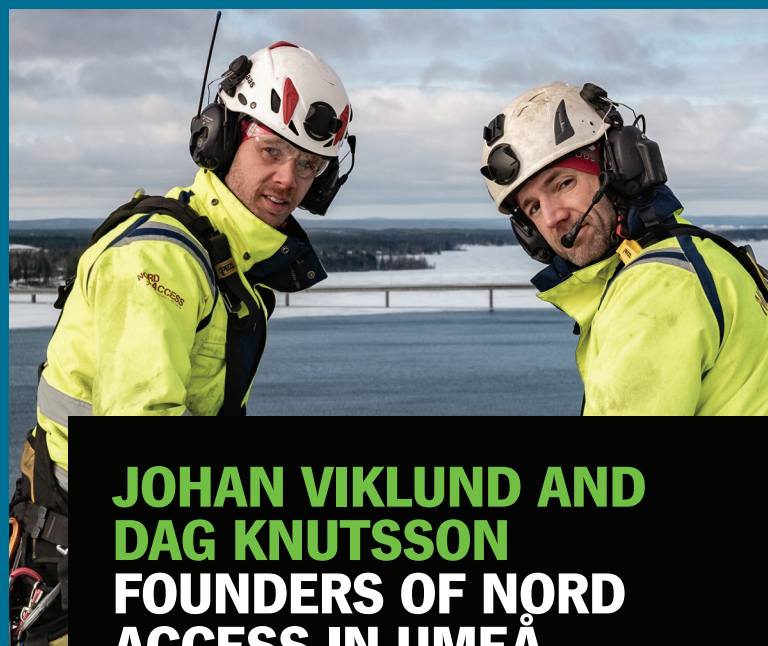
safety equipment, tools and other parts that are really needed for the task makes the work smoother, easier and faster. Before the work begins, we also fence off the area below. Despite this there is always a risk that a dropped object can bounce and fall outside the barrier. There have been cases in the construction industry where bouncing objects have resulted in deaths outside a fenced-off area. This is another reason to always secure tools, and you can't be careful enough!", says Johan Viklund.

Johan continues by saying that there are also many cases where the consequences of dropped tools become severe even at lower heights. Within both construction and industry there are several risk areas, such as dropping tools into a running machine, in tanks with liquid, or on sensitive surfaces. Hence, they are careful to secure their tools even when working close to the ground.

The tools are secured with lanyards. Nord Access use different lanyards adapted to various tasks. They prefer models that are elastic, have the right length and the right type of carbine hooks. The elasticity is important to absorb the energy of the dropped tool and reduce the jerk that might otherwise occur. It also reduces the risk of the lanyard being worn out prematurely. Important is also that the straps never by accident can detach from the harness or the tool, it must be properly locked in both ends. When it comes to rotary tools like screwdrivers, Nord Access uses swivels to avoid tangle.

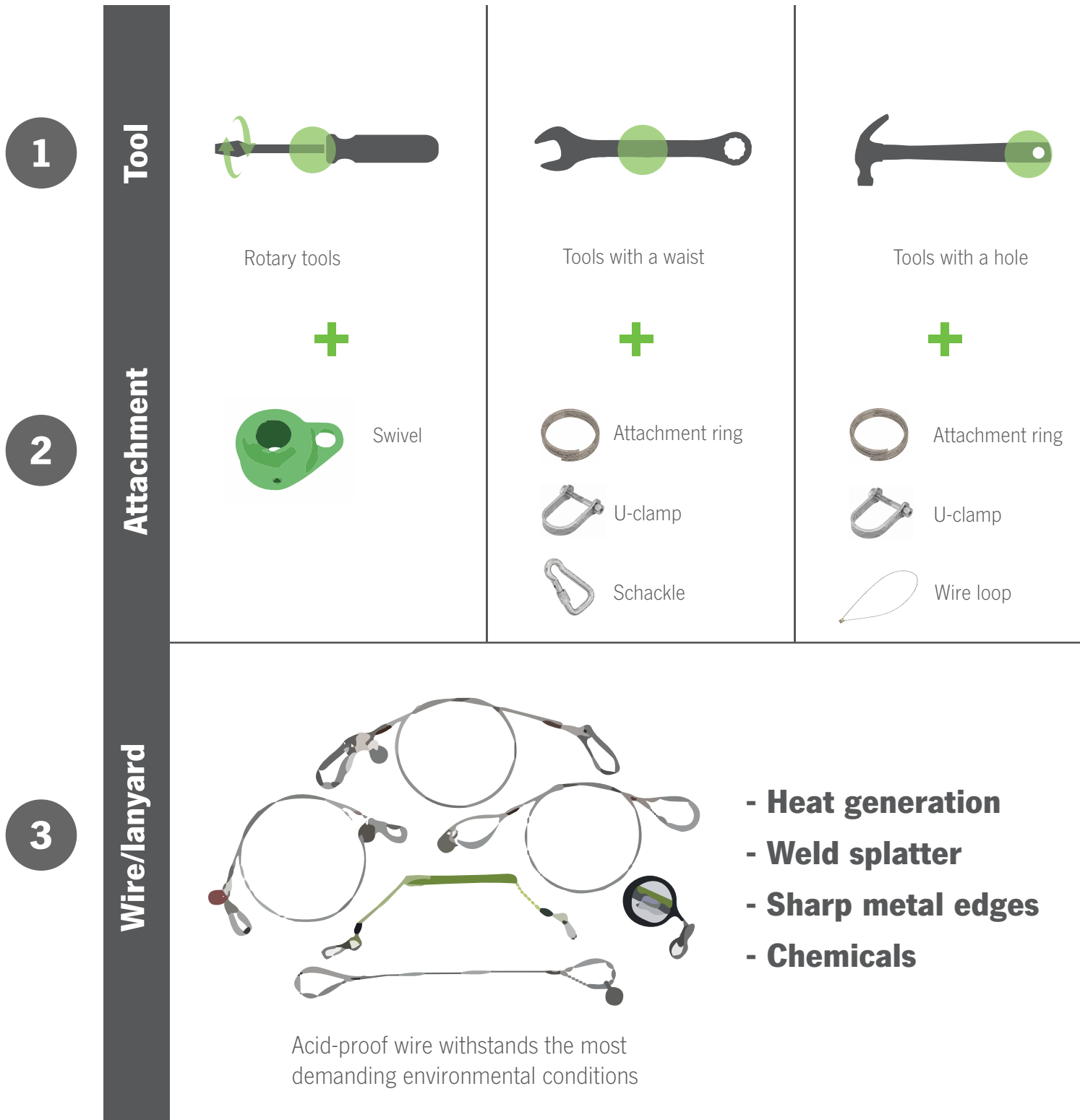
“Securing our tools is a foundation in everything we do in addition to securing ourselves”

– The safety requirements are increasing every year. The Swedish Work Environment Authority regulates the overall requirements to prevent accidents in workplaces. There are also local requirements from customers that reflects their safety policies, and our own requirements within SPRAT and the rope access industry. As awareness increases, so does the requirements. Also, the suppliers of safety equipment have an important role to continuously supply companies with the right products and education to minimize the risk of accidents, concludes Johan Viklund.



**JOHAN VIKLUND AND
DAG KNUTSSON
FOUNDERS OF NORD
ACCESS IN UMEÅ**

TOOL FALL PROTECTION – THREE EASY STEPS



Securing your tools is easy, especially if you have tools that are prepared for tool fall protection. With the right components, you can quickly secure your tools in ways that are optimal for different types of work situations.

- 1 Choose your tool
- 2 Choose the right attachment
- 3 Choose suitable wire or lanyard and assemble

VIEW OUR VIDEO CLIPS HERE
<http://bit.ly/2Rw1Rh0>



Tools with locked handle



Attachment ring



U-clamp



If a lanyard with loop is used, no further components are needed



Tools with an open handle without hole



Tape



Various holders



Lanyards are lightweight, extremely flexible and ergonomic

- **Construction**
- **Woodwork**
- **Carpentry**
- **Painting**

“DROPPING A TOOL, AND NOT BEING ABLE TO RETRIEVE IT, IS EXTREMELY COSTLY DUE TO LOST ELECTRICITY PRODUCTION”

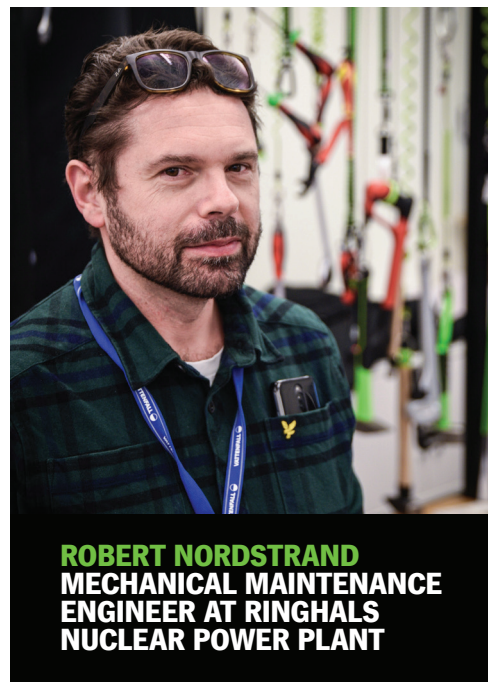


Robert Nordstrand is Mechanical Maintenance Engineer at Ringhals nuclear power plant. He knows the importance of not to drop tools or other objects during maintenance work. His job is to ensure an efficient operation and maximize operating time through proactive maintenance.

“When a technician drops an object in a sensitive area, it has already gone too far. We’ll always get the object out, but it costs time and money. Dropping a tool, and not being able to retrieve it, is extremely costly due to lost electricity production”, says Robert.

The solution to eliminate the risk of losing tools and other objects include several parts: knowledge through training and

routines, securing tools and objects so they cannot be dropped and knowledge of which tools are needed for the task at hand so that these can be secured and logged before use. When we follow this, we eliminate downtime!



ROBERT NORDSTRAND
MECHANICAL MAINTENANCE
ENGINEER AT RINGHALS
NUCLEAR POWER PLANT





WHY YOU SHOULD CHOOSE LUNA TOOLS TO SECURE YOUR HAND TOOLS

LUNA ZERODROP™

Luna Tools gives you access to both tools and accessories that guarantee your safety. With ZeroDrop™, you can easily secure your tools.

We have put great effort into finding universal solutions. Even though they are based on our wide range of hand tools, they can just as well be used on most other tools with the same dimensions.

ZERODROP™ ONLINE OR IN STORE

Whether you are online or in a physical store, you have easy access to our tool fall protection solutions. We have made tool fall protection easy to view, both online and in store, so it is easy to find the right solution for your needs.

WOULD YOU LIKE A WORKPLACE VISIT?

We are happy to come and offer tips and advice about how you can make your workday safer when using hand tools at heights. Please contact us for a chat without any obligations.

HELP FOR SPECIFIC CHALLENGES

At Luna Tools we develop products to make your workday safer. Do you have special challenges or have the need for customized solutions? Contact your nearest dealer, together we can find ways to help you, we always appreciate a challenge! You know which hand tools you need; we know how to secure them.

www.lunatools.com



43%

DO NOT HAVE TOOLS PREPARED FOR TOOL FALL PROTECTION

*Based on 206 telephone interviews with craftsmen in Sweden and Norway in June 2019. The survey was conducted by Solvero.

THREE BENEFITS WITH TOOL FALL PROTECTION

- Fewer accidents. Falling tools can seriously harm colleagues and others.
- Less material damages. Falling tools can cause costly damage for example on floors and countertops.
- Fewer interruptions. You don't have to spend time to retrieve or replace dropped tools.

CONTACT

Luna AB
Sandbergsvägen 3
441 80 Alingsås
+46 322 60 60 00
luna.se, lunatools.com

Follow us: 