BetaMed
CENTRUM MEDYCZNE

Life Saving Rules

„If you choose to break the rules, you send out the message that you are not interested in working for BetaMed."

For many years now safety has been and continues to be BetaMed's number one priority. We care about our employees, customers and subcontractors and are committed to providing a safe, accident-free workplace. We believe that by adhering to safety rules together, we will work even more safely together.

In 2011 we developed a list of 12 Life Saving Rules. These rules are clear, understandable to all and aim to reach a higher level of safety culture and more proactive accident prevention.

Each individual working for BetaMed, whether employee or subcontractor, is expected to follow these rules. Intentional violations of the Life-Saving Rules is a signal that the collaboration with BetaMed should not continue.

LIFE SAVING RULES

1. I do not work under the influence of drugs and/or alcohol.
2. I do not smoke outside designated smoking areas.
3. I wear the Personal Protective Equipments required for the job.
4. I never enter a confined space without authorization.
5. I wear an ambient gas detector when required.
6. I work with a valid safe work permit.
7. I apply isolation procedures before working on potentially energized systems.
8. I do not bypass EIS requirements without authorization.
9. I wear fall-prevention equipment when required.
10. I do not walk under suspended loads.
11. I secure the load on vehicles.
12. I always wear a seat belt when I am in a moving vehicle.

IF YOU CHOOSE TO BREAK THE RULES, YOU SEND OUT THE MESSAGE THAT YOU ARE NOT INTERESTED IN WORKING FOR BETAMED.

Please note that the sequence has meaning:

- LSRs 1, 2 and 3: What I decide on my own, of a general but personal nature
- LSRs 4 and 5: Anoxia Risk
- LSRs 6, 7 and 8: Permits and Authorizations
- LSRs 9 and 10: Heights and Cranes
- LSRs 11 and 12: Vehicles

1. I do not work under the influence of drugs and/or alcohol

WHY

Being under the influence of drugs and/or alcohol reduces the ability to work safely. The cognitive ability and the responsiveness decrease. The potential risks are therefore underestimated or not recognized. Moreover the reaction time increases. Both may lead to a fatal accident.

As the level of drugs or alcohol in your blood stream increases, the negative effect increases as well.

The following values take only the alcohol-bloodlevel into account:

- more than 0,2 ‰: cheerfulness and willingness to take risks increase,
- more than 0,3 ‰: alertness and ability to concentrate is reduced,
- more than 0,5 ‰: cognitive ability and responsiveness is reduced.

In combination with drugs, the effects of alcohol can be highly unpredictable, varying from extreme drowsiness and coma to hyperactivity and hallucination.

2. I do not smoke outside designated smoking areas

WHY

A burning cigarette, cigar or smoking pipe is a source of ignition. It can cause a fire or an explosion in presence of an oxygen-rich or explosive environment. Therefore lighting a cigarette is permitted only in designated smoking areas.
These areas are specifically defined and visually identified with signs to permit smoking.
BetaMed prohibits all types of smoking in non-designated areas.

EXAMPLE

Smoking at an ASU plant

An employee at an ASU decides to go outside the building to smoke a cigarette. The employee ignores the designated smoking signs and lights the cigarette. At the same time the atmosphere was enriched with oxygen released by high pressure compressor. The employee's trousers get burned and he suffers second and third degree burns.

A smoking Homecare patient

A Homecare patient decided to smoke a cigarette with the oxygen hose attached to his nose. As he lit the cigarette with a lighter, the hose as well as the oxygen mask started burning. Luckily, the flame which burnt all the way inside of his nose injured him only slightly.

Smoking in non-designated areas – such as high oxygen concentration areas – is very dangerous.

3. I wear the Personal Protective Equipment required for the job

WHY

Personal Protective Equipment (PPE) is specialized clothing or equipment worn by employees for protection against health and safety hazards. Personal protective equipment is designed to protect parts of the body, such as eyes, head, face, hands, feet and ears.

When all other measures of mitigating risks (collective, technical or organizational) are deemed not sufficient, the use of PPE is implemented.

PPE are therefore an important part of risk mitigation and may protect you from cuts, shocks, cryogenic burns, projectile particles, noise, oxygen deficiency, oxygen enrichment, toxic or flammable gas release. If used properly, it prevents people from getting hurt or even being killed.

Applying safety rules and protecting oneself with appropriate PPE contributes to safe working conditions.
The wearing of required PPE also demonstrates a safety-oriented mind in compliance with the BetaMed safety culture.

EXAMPLE

Cryogenic burn of a BetaMed employee

A BetaMed operator was burned on his right palm, despite wearing gloves. The operator opened a dewar container's valve and inserted the filling tube. As indicated in the filling rocedure, he blocked off the top of the tube with his right hand, which was protected with a glove. As he connected the filling tube to the helium liquefier container, his hand felt cold but he left it in position while attempting to make the fill connection. After this operation, he noticed that the palm of his hand was seriously burned. Since the gloves he was wearing were only designed to handle refrigerated products above -25°C, they did not offer sufficient protection against the liquid helium (which was about -269°C) causing a severe cryogenic burn.
Some of the main accident causes:

- the operator was not aware and/or underestimated the risk of cryogenic burns,
- the choice of PPE was not appropriate for the task being performed.

Wearing the right PPE in the right way is good protection! With bad PPE you take unpredictable risks!

4. I never enter a confined space without authorization

WHY

A confined space is an enclosed or partially enclosed area that is not designed for continuous human occupancy. Although a confined space is large enough for a worker to enter to perform an assigned time-limited tasks, the opening used for entry is often not suitable to ensure proper ventilation and can make escaping, evacuating or rescuing very difficult. Examples of confined spaces include silos, vats, hoppers, utility vaults, tanks, sewers, pipes, access shafts, trucks or rail tank cars, and certain warehouses. Ditches and trenches as well as insufficiently ventilated rooms may also be considered a confined space when access or egress is limited.

Confined spaces are especially dangerous due to the lack of ventilation that increases the risks linked to hazardous atmospheres such as accumulation of flammable gases or vapors, oxygen deficiency, oxygen enrichment, or toxic product release.

Every year many fatalities within the industry occur while performing work in a confined space. Moreover studies have shown that over 60% of confined space deaths occur among would-be rescuers. In each facility all confined spaces must be identified and a risk assessment must be carried out. In addition Safe Work Permits shall be applied prior to any entry into a confined space. Based on the assessment and the Safe Work Permit, people can be authorized to enter a confined space, when appropriate mitigation measures have been defined, implemented and checked.

All people involved in confined work must be familiar with potential hazards and be able to recognize the signs or symptoms of exposure to them. They must review the safe work/entry permit and be comfortable with the precautions and safeguards taken. They must Iso understand that entry for rescue purposes can only be done by specially trained personnel, so that rescuers do not endanger their own lives.

EXAMPLE

Oxygen-Deficiency in a water tank

During cleaning and painting maintenance of internal and external surfaces of a drinking water tank, nitrogen was injected into the vessel instead of air. A third party employee entered the tank without verifying the O_2 concentration. Asphyxiation was immediate and the unconscious employee was discovered minutes later. Two unqualified and unauthorized BetaMed employees entered the tank to try to rescue him and collapsed as well. Fortunately, they were retrieved from the tank quickly by trained rescue personnel and sent to a hospital for respiratory intensive care where they recovered. The third party employee did not survive due to his long exposure to the oxygen deficient atmosphere.

Some of the main accident causes:

- the Safe Work Permit was not complete – it did not detail the rescue procedure and did not take into account the risk of injecting inappropriate gas into the tank,
- there was no supervision on site to verify the working conditions.

5. I wear an ambient gas detector when required

WHY

There are situations where a combination of factors may lead to a dangerous atmosphere: oxygen-deficient atmosphere with the risk of anoxia, oxygen-enriched atmosphere with the risk of fire, flammable atmosphere with the risk of fire and explosion or toxic atmosphere with the risk of being poisoned.

Such situations require a risk assessment. One of the important mitigation measures to be taken is to wear a relevant gas detector with appropriate alarm thresholds. It aims at allowing people to exit an area before an exposure becomes dangerous.

Within BetaMed facilities or at customer premises, areas and tasks requiring the use of a gas detector must be clearly defined and identified.

The use of a gas detector must be trained prior to its use in potentially dangerous environments.

EXAMPLE

Oxygen-deficiency during maintenance work

An employee, equipped with personal protective equipment (PPE), including a personal oxygen detector, proceeded to carry out routine maintenance tasks inside a cryochamber. During the work, an unnoticed, silent leak occurred in the installation, resulting in a slow release of liquid nitrogen.

As the substance vaporized, it displaced oxygen from the room's atmosphere in an odorless and colorless manner. Upon registering a drop in oxygen concentration to the warning threshold of 19.0%, the employee's personal detector activated an alarm. In accordance with the applicable procedure, the employee immediately ceased their activities and initiated evacuation towards the exit.

During the evacuation, the ongoing leak caused a further, rapid decline in oxygen concentration. The device triggered the second-stage (critical) alarm at 18.0%, signaling an immediate threat to life. At that moment, the employee began to experience the first symptoms of hypoxia (slight dizziness).

Thanks to the immediate reaction and strict adherence to safety procedures, the employee managed to leave the hazard zone just before losing the ability to move independently. A review of the stationary monitoring system readings inside the chamber indicated an oxygen level of 9.5% – a value that, had the employee remained in the room, would have led to irreversible unconsciousness and death.

6. I work with a valid Safe Work Permit

WHY

A Safe Work Permit is not just another document to fill in; **it can save peoples' lives**.
One third of the work related fatalities during BetaMed operations could have been avoided if a Safe Work Permit had been used.
According to the IMS System, prior to performing non-routine or hazardous routine jobs not covered by procedures, a Safe Work Permit has to be filled out in order to ensure that all risks are identified and mitigated.
The Safe Work Permit specifies the elementary tasks to be accomplished and authorizes performing the job under the strict observance of specified work and safety mitigation measures. Informing all other concerned parties (process, operation, safety, customers, contractors) is mandatory and their agreement must be obtained prior to beginning the work.
The Safe Work Permit shall also address the surrounding conditions, especially the ones that could interfere with the work. Theses interferences occur when several people or companies are working in the same surroundings and one's actions may have an impact on others. The Safe Work Permit has to be issued by a qualified person. It has to be reviewed with and explained to the individuals doing the work. To issue this document, the place where the operation is taking place has to be visited; the risks and respective mitigation measures have to be identified; the persons performing the job have to understand the risks and the measures taken to mitigate them; a validation date has to be defined.
Make sure you comply with the defined measures before starting any job that requires a Safe Work Permit.

EXAMPLE

Fatality case with O_2 enrichment in a confined underground space
A welder and a fitter were working on the replacement of an existing steam drain line above a concrete gasholder pit (80 m^3).
The fitter went into the pit in order to hold the steam drain line. Meanwhile the welder was welding the pipe outside the pit. When the welder started welding, some sparks fell down into the pit. The fitter's clothes started burning instantaneously.
The fitter was burnt 98% and passed away 3 weeks after the accident. The welder was burnt 10% to the head, hands and legs because he entered the pit trying to rescue his colleague.
Some of the main accident causes:

- Safe Work Permit was issued without performing the mandatory visit to the workplace – therefore the risks of the job were not properly identified,
- high oxygen content of the atmosphere in the confined pit,
- an oxygen sensor was not used,
- no firefighting equipment was brought to the workplace.

The Safe Work Permit identifies hazards and helps implement mitigation plans: accidents are avoided.

7. I apply isolation procedures before working on potentially energized systems

WHY

There are several different kinds of energized systems such as pressure, electricity, temperature or moving parts. When we have to work on any kind of energized system, special precautions have to be taken so that we are not exposed to the energy that can harm or kill us.

Several fatalities that occurred in BetaMed operations are due to the inadequate observance of isolation procedures.

The best way to avoid exposure to dangerous energy is isolation, ensuring that the energy or the product cannot reach any person.

The most common procedure to apply is the "Lock Out – Tag Out" (LOTO) procedure which physically disconnects the energy source at the point to be worked on.
There are several kinds of LOTO procedures such as the shutdown of electricity via the main switch and locking it, the elimination of pressure by closing a valve and securing it shut or the introduction of a blind flange into a piping system.

All of these procedures have the same targets:

- allowing us to work safely – isolated from dangerous energy sources,
- clearly identifying the situation,
- eliminating the risk of the reconnection of energy.

EXAMPLE

Unscheduled maintenance on an autoclave

A maintenance technician began scheduled maintenance work on autoclave No. 3. In accordance with the LOTO (Lockout-Tagout) procedure, the employee correctly isolated all hazardous sources of energy: electrical and high-pressure steam. At each isolation point (switches, valves), the technician applied a personal padlock and a warning tag indicating ongoing work.
A sterilization department employee, not directly involved in the maintenance, noticed that the device was powered down. Mistakenly believing that a routine breakdown had occurred and wanting to expedite work, they attempted to restart the autoclave from the main control panel. The device did not start because the physical locks prevented the energy supply. The technician, located in the service zone, sustained no injuries. The incident did not result in any equipment damage.

8. I do not bypass EIS requirements without authorization

WHY

An EIS (Element Important for Safety) is a protective measure that exists to preserve peoples'lives. An EIS may be a piece of equipment, an interlock, a physical barrier, a procedure or training.

Ensuring the permanent good functioning of all EIS is of maximum importance. However, to do so you need to know what are the EIS on your site or for an installation.

This is why according to the IMS System: the determination of an EIS must be done with a risk assessment; an EIS list must be available for each installation; a complete maintenance plan must exist; temporary or alternate risk mitigation measures must be defined and implemented when an EIS becomes unavailable (during EIS maintenance or malfunction for example). A good practice is to identify EIS on the site and in the PID.

If you are about to make an intervention on equipment and you realize it is an EIS, you cannot proceed unless you are formally qualified and have a proper authorization that will ensure that the procedure in case of malfunctioning EIS is followed. The compensatory measures defined therein will ensure that the work can be done with the same level of safety as with a functioning EIS in place.

It is therefore obvious that if someone decides to bypass EIS requirements without authorization, his/her life or the lives of others are put at risk.

EXAMPLE

Routine EIS Inspection – Power Generator

A mains power failure occurred at the hospital. The backup system functioned correctly, activating the power generator. However, after 32 minutes of operation, the generator suddenly shut down. This resulted in a total power loss in critical departments, including the Intensive Care Unit (ICU) and the Operating Theatre, for a period of 1 hour and 43 minutes. This situation posed an immediate threat to the lives and health of patients connected to life-support equipment, forcing medical staff to take immediate emergency actions, including manual ventilation.

The investigation revealed that two days prior, a technical department employee had performed a routine inspection and load test of the unit. Following the hospital's established procedure, the employee started the generator and verified its electrical parameters, which were within normal limits. The checklist used by the employee did not include an item mandating the physical verification and recording of the fuel level in the tank.

You must never forget that the importance of an EIS is to protect peoples' lives.

9. I wear fall-prevention equipment when required

WHY

Working at heights is by definition dangerous. Falling, even from small heights can lead to severe injuries (broken bones, neurological disorders, death …) depending on the body parts involved and on potentially aggravating factors in the surroundings (e.g. sharp objects).
Individual fall-prevention equipment must be selected according to the job hazard analysis or Safe Work Permit assessment.
When working at heights, approved elevating platforms or scaffolding should be used whenever possible. Nevertheless, individual fall-prevention equipment needs to be used in addition.
In any case, mitigating measures have to be taken in order to ensure that the risk of falling and/or the risk of injury when falling is eliminated.
Specific training is required for the use of individual fall-prevention equipment. Before using it, check that it is in good condition.

EXAMPLE

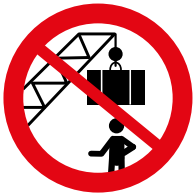
Fall from a platform

As an operator was working on an elevated platform, 3m off the ground, performing maintenance on piece of machinery, a wrench fell out of his tool belt. He looked over the edge of the platform to see whether his tool had injured someone down below when he lost his balance and fell from the platform. He was not wearing a safety harness and his helmet was no protection against the impact on the ground. The injuries to his head were so serious that he never entirely recovered from this fall.
Some of the main accident causes:

- the operator was not wearing any individual fall-prevention equipment preventing him from falling,
- the scaffolding he was using was not constructed according to safety standards,
- no Safe Work Permit assessment had been performed prior to staring the job – the risks at hand were not identified.

Using the right equipment in the correct way will prevent you from falling or in case of falling it will prevent you from getting seriously injured or dying.

10. I do not walk under suspended loads



WHY

Make sure an falling object can't fall on you. Don't stand, walk, or work under crane booms or suspended loads – you could be seriously injured or killed.

Always remember: it might not even be the load that falls, but a piece of equipment that was left on top of the load before lifting.

There are strict measures and rules to follow when suspending a load to keep it from falling. But the most effective measure to keep a load from falling on you is to always "go around and not under it".

EXAMPLE

Installation of a new tank

A new tank needed to be installed at a customers' site. The technician had ordered a crane from a subcontractor for the unloading of the tank. This was a routine maneuver for the technician as he had installed many tanks before. Today he was in a hurry.

As usual, prior to lifting, the belts and the hooks were thoroughly checked. The crane operator started pulling the tank into the air. The technician moved to the spot where the tank was to be installed without paying attention to the suspended load, walking under it. All of a sudden one of the hooks on the tank ripped off and it crashed down right next to the technician hitting his arm.

Had he not been in a hurry, he would have kept away from under the load. It would have been very easy to avoid this accident.

11. I secure the load on vehicles

WHY

When starting a vehicle, when braking, changing lanes, driving through a turn, as well as on roads in bad condition, strong forces act on the load. These forces can lead to the displacement of the load or can result in the load falling off the vehicle. The purpose of securing a load is to ensure that the load does not move under any driving condition.

A load that shifts or falls off while driving may cause substantial damages to passengers, to people in the surroundings, to the vehicle or to the load itself. A shifting load may also reduce the ability of the driver to control the vehicle (staying within a lane, braking or even keeping from rolling over).

Correctly securing the load is primarily the responsibility of the driver. For dangerous goods, the verification of safe loading is also part of the site responsibility. The driver and the distribution site manager might not only have to bear the moral, but also the legal consequences in case of an accident.

EXAMPLE

Loss of cylinders while driving

A cylinder driver loaded a number of baskets filled with cylinders onto a truck for delivery. He failed to secure the load properly. On his way to a customer he drove through a tight roundabout. As he drove through it, a basket containing 6 nitrogen cylinders tumbled and fell over the railing of the truck. Fortunately there were no people or other cars nearby so the damages were limited to the load. Had a pedestrian been standing in the vicinity, he could have been struck by the load and possibly been killed.

12. I always wear a seat belt when I am in a moving vehicle

WHY

A person driving in a vehicle and not wearing a seatbelt will fly straight into the windshield or against the instrument panel in case of a frontal accident. In a car equipped with airbags, these should deploy, but an airbag is not intended to be a substitute for a seat belt. You must always wear a seat belt. Should the car overturn or spin, wearing the seatbelt will keep everyone in the car where it is safer.

Even at a low speed such as 30 km/h, an impact can end in death, since your weight is multiplied twenty times:

- an impact at 50 km/h is equivalent to a fall from 10 meters,
- an impact at 100 km/h is equivalent to a fall from 35 meters.

By wearing a seat belt you decrease the risk of a fatal accident by 10 times. The seatbelt is the most important lifesaver in traffic. Since its introduction, it saved the lives of around 1 million people worldwide.

The airbag is designed as an addition and not as a replacement to the seat belt. The combination of seat belt, airbag and head support offers you optimal protection in case of a crash.

Fastening your seatbelt takes only a few seconds, seconds that can save your life. Wearing a seatbelt is not an option!

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