

## Euroports (Group HQ, Antwerp-Belgium) - Line of Fire program

*mitigating cause/consequence from primary risks in bulk and break bulk handling*

### the challenge

The port environment is far from benign and unfortunately, to this very day has seen its fair share of very serious, life-changing or even fatal accidents. The approximately 50 Euroports locations worldwide have not been exempt from this in the past. There was, and for the foreseeable future - as long as personnel are working in the vicinity of heavy machinery and transport means and/or in the confines of vessel holds and other limited spaces - will remain a clear and urgent need to prevent any harm from happening to these people.

Measures to achieve this should look both at preventing incidents from happening in the first place (left side of the bowtie) and to mitigating the consequences should something happen after all (right side of the bowtie).

Measures need to be implemented proactively rather than reactively, often following an actual accident or near-miss.

### the innovation

By combining several existing techniques and tools, also from previous experience, a so-called Line of Fire (LOF) program was developed, aimed at mitigating if not completely eliminating either cause or consequence, or both, from primary risks in our bulk and breakbulk handling industry. To determine these primary risks, an analyses was made of severe accidents over the previous 10 years, both within our own company as well as industry wide port operations. This resulted in the identification of 8 high risk areas, 7 of which were assessed to have the potential for accidents with a (near) fatal ending. The resulting program consists of an Excel based self-assessment tool with a scoring used for a safety bonus remuneration system on

### Line of Fire Risk Assessment → LoF Tool

**PRIORITY LINE-OF-FIRE RISKS**

1	<b>Moving vehicles/heavy equipment</b> ■ Stay clear of potentially moving vehicles ■ Establish eye contact with driver/operator ■ Implement man-machine separation measures	
2	<b>Lifted/hoisted loads</b> ■ Prevent entry of hoisting zone ■ Use tag lines for steering and stability ■ Use proper rigging equipment; inspect and maintain	
3	<b>Objects with fall/roll potential</b> ■ Be aware of top-heavy objects that could shift ■ Be aware of objects that could roll/shift ■ Remove adequate bracing/controls in place	
4	<b>Confined spaces (+ vessel holds)</b> ■ Beware of noxious fumes, low oxygen and fire risk ■ Measure before entry; ventilate or use PPE as needed ■ Have people trained/emergency arrangements ready	
5	<b>Work at height (+ dropped objects)</b> ■ Use fall protection when working unprotected > 2m ■ Secure zone and tools and equipment that could fall ■ Use tool bags and hand lines as needed	
6	<b>Objects under tension/pressure</b> ■ Stand clear / aside when switching transferers on ■ Be aware of chains/straps/ties under tension ■ Properly secure and handle pressurized objects	
7	<b>Moving parts/rotating equipment</b> ■ Prevent sudden and unexpected movement ■ Never handle rotating/moving parts ■ Isolate/barricade off moving parts where possible	
8	<b>Hand/power tools</b> ■ Prevent LUL situations (e.g. cutting towards limbs) ■ Beware of flying debris; take proper precautions ■ Properly maintain and inspect tools (before use)	

LOF Assessment Tool => Compliance %

### → Safety KPI

**Highest Severity Potential**

- 1 Moving vehicles/heavy equipment
- 2 Lifted/hoisted loads
- 3 Objects with fall/roll potential
- 4 Confined spaces (+ vessel holds)
- 5 Work at height (+ dropped objects)
- 6 Objects under tension/pressure
- 7 Moving parts/rotating equipment

- Self Assessment
- Improvement plan
- Score improvement
- = Target (+ entry level)
- Re-assessment + proof
- = Measure of success
- X-audits (verify + assist + learn)

14 |

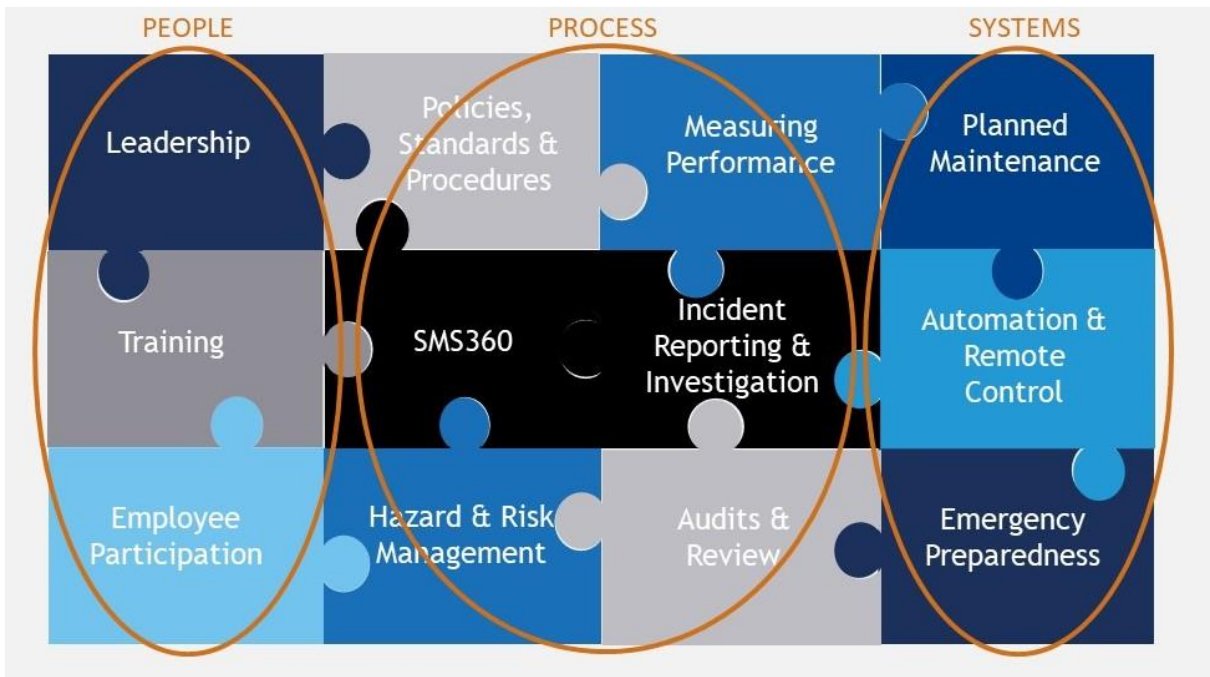
the one hand, and a communication and learning campaign on the other. The focus of this submission for the 2023 Safety Award is on the self-assessment tool and use thereof.

### LOF RA Tool

LOF1: Moving Vehicles and Equipment		Audit Score	Evidence	Actions Required & Comments
Total Score		48%		
<b>PEOPLE</b>				
<b>Pedestrian Safety Items</b>				
1	High Visibility clothing (safety vest as a minimum) is worn by all pedestrians entering operational areas (i.e. employees, contractors, truck drivers, third parties & visitors).	75%		
2	Pedestrians make eye contact with equipment operators and truck drivers when in close proximity.	75%		
3	Mobile phones and personal entertainment devices are not used when walking in operational areas.	75%		
4	Truck drivers who are required to leave their vehicles, remain in designated safe areas.	0%		
<b>Safe use of mobile equipment</b>				
<b>PROCESS</b>				
<b>Managing risks</b>				
12	The site conducted a formal risk assessments for pedestrians safety.	100%		
13	The site conducted a formal risk assessments for mobile equipment safety.	100%		
14	Risks that may result in injuries to people and/or damage to the environment and equipment are controlled.	50%		
<b>SYSTEMS</b>				
<b>Terminal Design and Layout</b>				
16	Physical barriers are used to separate pedestrians and workstations from mobile equipment.	50%		
17	Workstations, equipment, bins, racks, etc. are located clear of regular paths of mobile equipment.	50%		
18a	There are designated safe areas for external trucks to pin/unpin loads outside operational areas.	0%		
18b	Visibility aids are used where required, such as convex mirrors or bollards on blind corners.	75%		
18c	Lighting levels are adequate (comply with local legislation or as a minimum 10 lux on access routes and 50 lux in areas where people and mobile equipment are in close proximity).	50%		
18d	Speed reduction measures (e.g. speedbumps) have been installed to assist in reducing vehicle speeds in known areas of pedestrian activity.	50%		
18e	The site provides inter-terminal transport (eg. shuttle buses, cars, e-cars) for movement of pedestrians in and through operational areas.	75%		
15	40			

Scale = 0-25-50-75-90%/100%

In short, each LOF-category in the tool comes with a myriad of minimum requirements that should be (put) in place to prevent or mitigate risks. The scoring per item can be 0, 15, 50, 75, 90 or 100%, but any element prone to human error may not be scored higher than 90%. The total score per LOF (and 1 general risk management) topic are summarized into one overall, average score being used for target and hence bonus award purposes (see the pictures for a better understanding).



how it was implemented

First the tool was designed around 6 of the mentioned risk areas. After peer consultation and comment rounds approval and support was sought from and given by the company's executive committee. Subsequently a road tour was done throughout the countries to explain the tool to the local management teams. As a result in a next iteration, the 7th risk area was added to the tool. Finally joined sessions were organized with local terminal teams to actively start working with and finally completely filling the tool with applicable compliance scores at the time of implementation. The latter formed the baseline score for the respective locations from which the initial targets were set for the first year. As there is some room for subjectivity in scoring, it was made clear that the tool was not meant for benchmarking but for improvement purposes only. Though primarily a self-assessment tool, the measure of improvement in the score on an annual basis is used for safety bonus remuneration purposes. This is possible because proof needs to be presented for any score increase as per local action plan to the Group QHSE director and these claimed improvements are further validated during an ongoing, peer-audit system with 2 audits a year per entity (1 per year for some smaller ones).

### 2021 LOF Risk Assessment → Baseline and (entry) Target setting + LOF1 minimum + significant progress ≥ 3 categories!!

**PRIORITY LINE-OF-FIRE RISKS** **EUROPORTS**

- 1 Moving vehicles/heavy equipment**
  - Stay clear of (potentially) moving vehicles
  - Establish eye contact with driver/operator
  - Implement man-machine separation measures
- 2 Lifted/hoisted loads**
  - Prevent entry of hoisting zone
  - Use tag lines for steering and stability
  - Use proper rigging equipment; inspect and maintain
- 3 Objects with fall/roll potential**
  - Be aware of top-heavy objects that could shift
  - Be aware of objects that could roll/shift
  - Ensure adequate bracing/controls in place
- 4 Confined spaces (+ vessel holds)**
  - Beware of noxious fumes, low oxygen and fire risk
  - Measure before entry, ventilate or use PPE as needed
  - Have people trained/emergency arrangements ready
- 5 Work at height (+ dropped objects)**
  - Use fall-protection when working unprotected > 2m
  - Secure zone and tools and equipment that could fall
  - Use tool bags and hand lines as needed
- 6 Objects under tension/pressure**
  - Stand clear/gods when switching breakers on
  - Be aware of chains/straps/ties under tension
  - Properly secure and handle pressurized objects
- 7 Moving parts/rotating equipment**
  - Prevent sudden and unexpected movement
  - Never handle rotating/moving parts
  - Isolate/banish off moving parts, where possible
- 8 Hand/power tools**
  - Prevent LCE situations (e.g. cutting towards limbs)
  - Beware of flying debris, take proper precautions
  - Properly maintain and inspect tools (before use)

LOF Assessment Tool ⇒ Compliance %

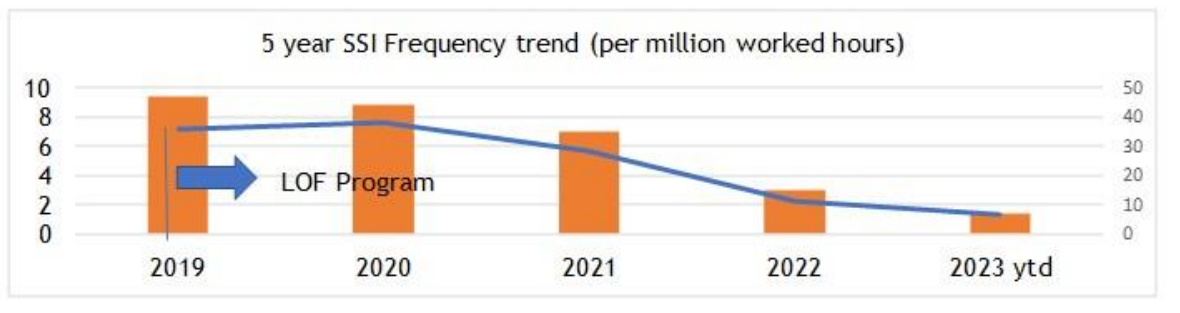
LOF1: Moving Vehicles and Equipment		Assess Score	Evidence	Actions Required & Comments
		Total Score	48%	
<b>PEOPLE</b>				
<b>Prevention Safety Items</b>				
1	Signaling devices (lights, sirens) are in a minimum view to all pedestrians moving operational areas (e.g. pedestrians, contractors, truck drivers, other people) & vehicles	75%		
2	Man-machine contact is limited with equipment operators and truck drivers when in close proximity			
3	Visible alarms and pressure interlocks devices are installed when entering operational areas			
4	These devices are not used to force the vehicles, vessel or designated infrastructure			
<b>MANAGING RISKS</b>				
11	The site conducted a formal risk assessment for pedestrian safety	100%		
12	The site conducted a formal risk assessment for mobile equipment safety	100%		
13	Entry that may result in injuries to people and/or damage to the environment and equipment are controlled	50%		
<b>TERMINAL DESIGN AND LAYOUT</b>				
14	Provision barriers are used to separate pedestrian and construction from road equipment	50%		
15	Provision barriers, equipment, lines, cables, etc. are located clear of major paths of mobile equipment	50%		
16	There are designated safe areas for external trucks to park/stop loads outside operational areas	75%		
17	Designated areas are well marked/signaged, such as barrier restriction or tables on blind corners	50%		
18	Lighting areas are adequate comply with an illumination of at a minimum 10 lux on access routes and 50 lux in other where people and mobile equipment are in close proximity	50%		
19	Speed reduction measures (e.g. speedborders) have been installed to assist in reducing vehicle speeds in known areas of pedestrian activity	50%		
20	The site provides other terminal transport (e.g. shuttle buses, cars, etc.) for movement of pedestrians in and out of terminal			

Category	Compliance %
General Risk Management	55,8%
LOF 1: Moving Vehicles/Equipment	70,6%
LOF 2: Lifted & Hoisted Loads	63,5%
LOF 3: Shift Potential	55,4%
LOF 4: Confined Spaces	56,5%
LOF 5: Work at Height	35,7%
LOF 6: Objects under tension	62,5%
LOF 7: Moving Parts	57,6%
<b>Overall performance</b>	<b>61,0%</b>

Overall performance year y = baseline for year y+1 target setting (min entry) **EUROPORTS**

result

Qualitatively speaking, the use of the tool (and matching campaign) had a very positive impact on the pro-active further improvement of safety in our entities. Where before, improvements were primarily driven by corrective actions following lost time incidents or worse, with the implementation of the tool and the need to increase the compliance score to make the year-end target came an ever-increasing proactive mindset to fix things before they go wrong. Quantatively speaking, the number and frequency of serious safety incidents (accidents or near misses with a life-changing or -ending potential, notably, no fatalities occurred since implementation) declined drastically in the years following implementation (2019).

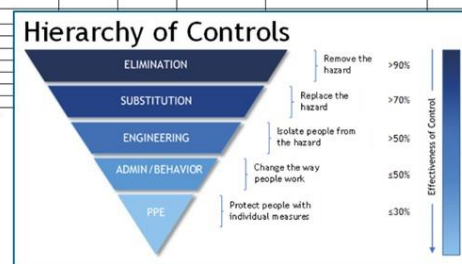


*conclusion*

There are undoubtedly more factors that had a positive influence on our companies safety results over the past 4 to 5 years. Ironically, we did see a slight increase in so called lost time injuries (LTI), especially during the Covid-19 period. But overall, the total number of recordable injury incidents also declined. At the same time, we also invested a lot of effort in more and better reporting, initially resulting in an increase of (reported!) incidents. Adding a reward component (previously based on LTI numbers) had a positive impact on the tool’s implementation and continued usage over the past 4 years, with matching results.

LOF ACTION PLAN*											
#	LOF	Non conformance to question #	Required Action	Effectiveness of control (See Introduction)**	Owner	Involved parties	Start date	Deadline	Budget	Evidence of closure	SMS360 #
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
..											
xxx											

\* The action plan tab is designed to assist with the development of an action plan, all resulting actions shall be transferred to SMS360 for sake of proper follow up.  
 \*\* Labeling the action for level of effectiveness is mostly an indication and serves as a reminder to continuously strive for the highest level achievable



LINK: <https://www.euroports.com/>