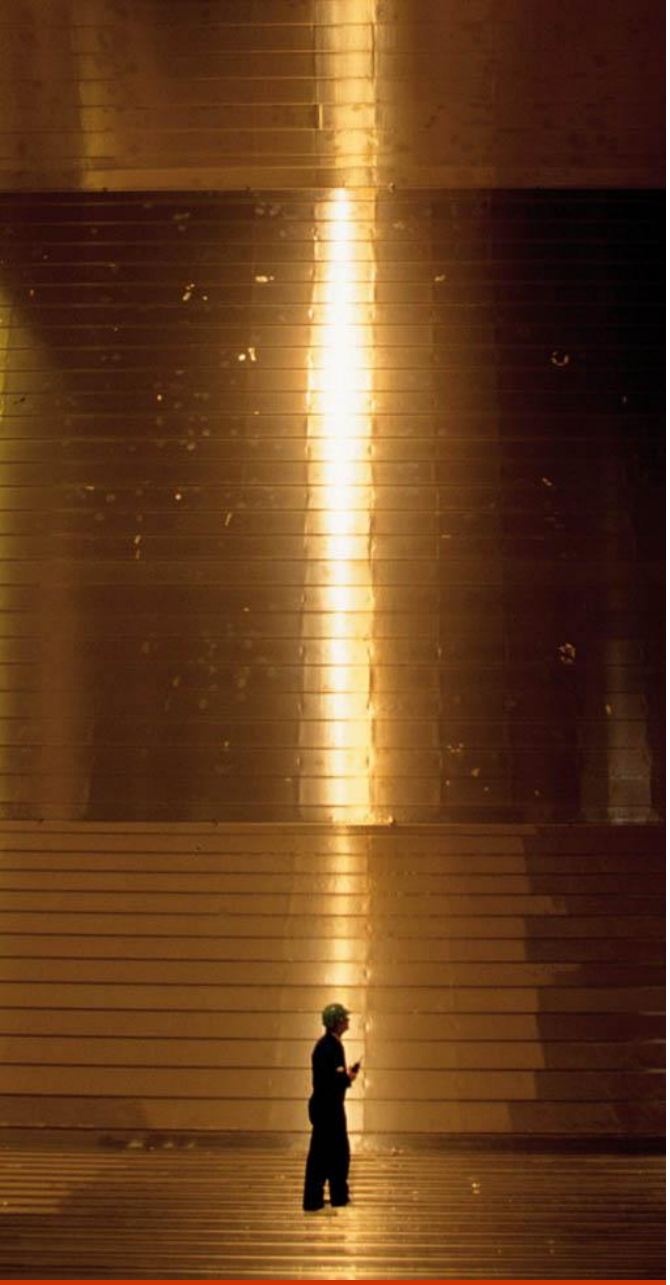


ALLOYS,
ORES AND PEOPLE.

ERAMET

Welcome to

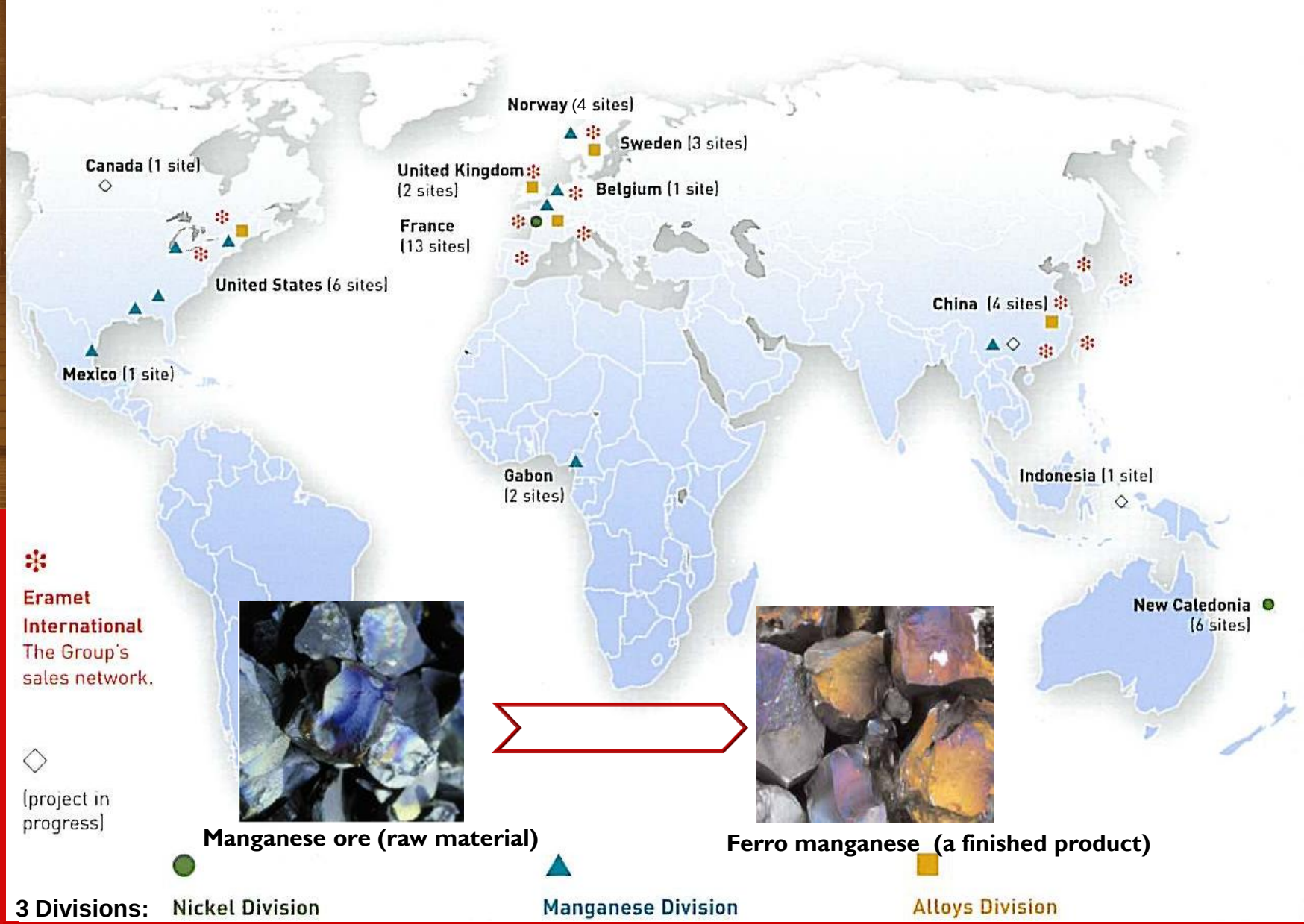
International Manganese Institute

IMnI 2nd Safety Workshop

Day 2 , Tuesday May 3, 2011

Bjørn Kolbjørnsen
Plant manager Eramet Norway Porsgrunn

GROUP



Manganese ore (raw material)

Ferro manganese (a finished product)

3 Divisions: Nickel Division | Manganese Division | Alloys Division

French international company

2009: 15000 employees, 2 689 million € turnover

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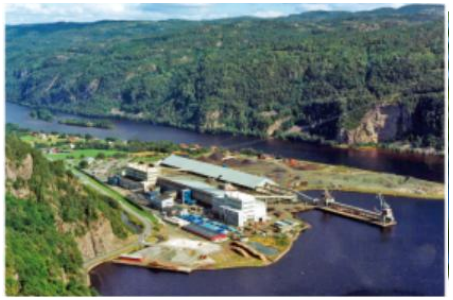
ERAMET NORWAY

A world leading producer of
Manganese alloys

Eramet Norway Sauda

Eramet Norway Porsgrunn



Eramet Norway Kvinesdal

Eramet Titanium & Iron

The golden Mn - triangle

A pioneer and a pillar within Titanium production

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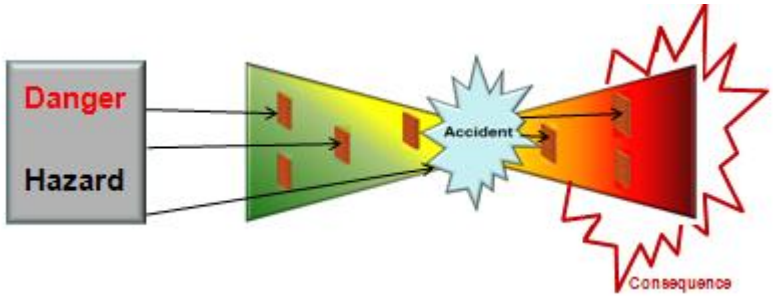
“Safety barriers & bow tie”

Presentation includes

a short introduction to:



by: Bjørn Kolbjørnsen

Our basis for the safety work (and other tasks)

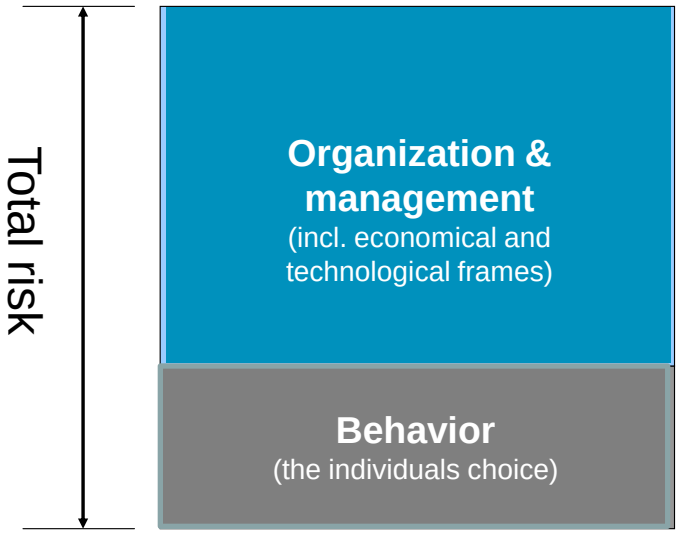
Some have this basis (often associated with the BBS approach):

You should focus on unsafe actions/behavior since they are believed to be the majority (80-90%) of the reasons accidents occur. (failure of man)

But you can choose to raise the question:

Is there a reason beneath the unsafe behavior/ failure of man?

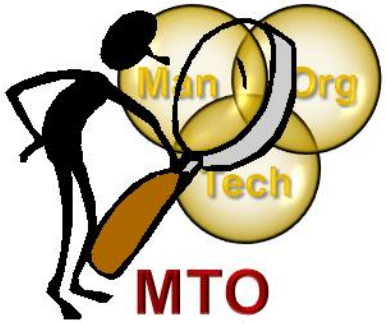
We choose to see it this way:



MTO – Man, Technology, Organization

System approach;

– the **interface** between man, technology and organization



- **Man** Makes mistakes and prevents errors
- **Technology** fails (people are trained to recognize technical failure)
- **Organization** Latent errors

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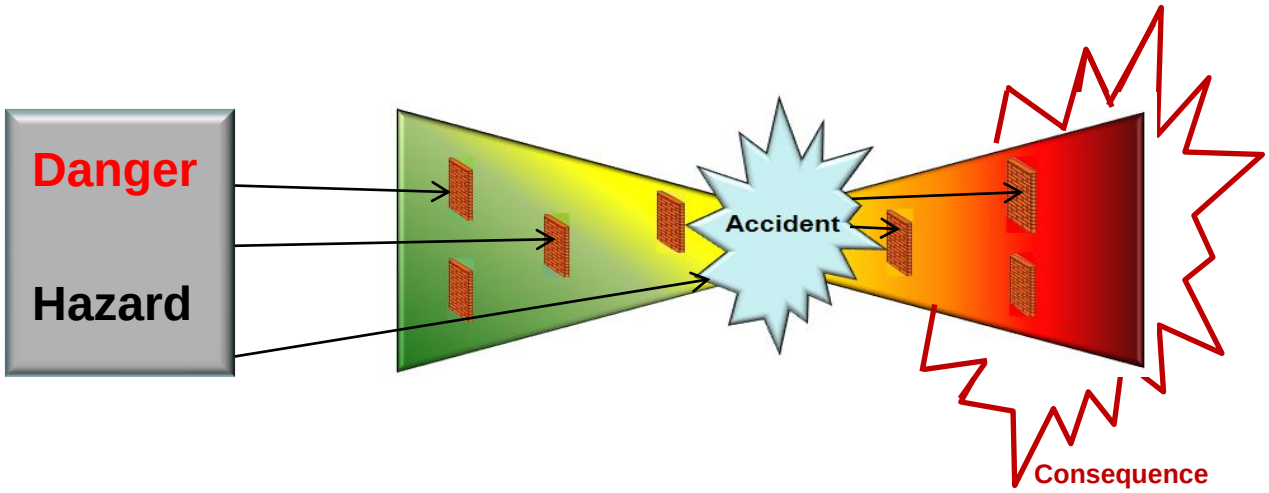
Bow- tie and safety barriers

Working with safety we have to address the total risk, and acknowledge the complexity of our activity.



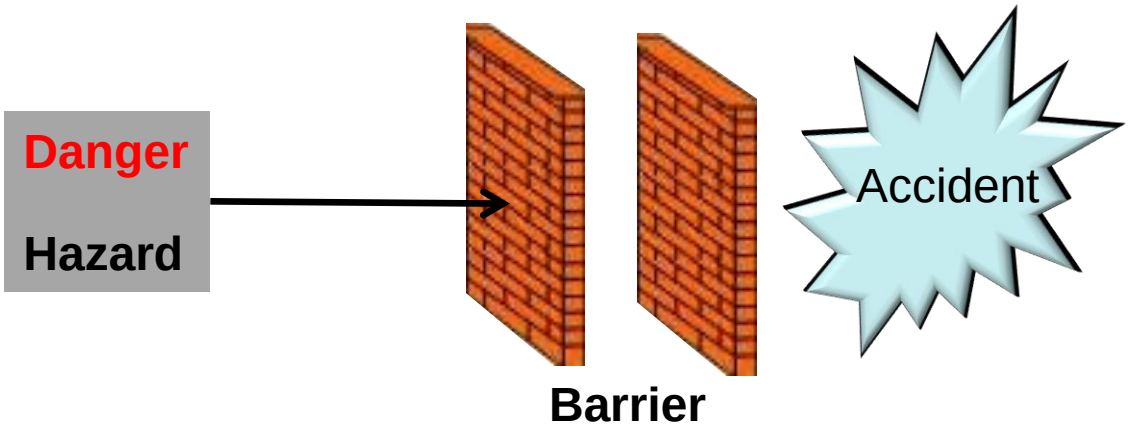
The bow tie and our safety barriers gives a god illustration of what we do to prevent an accident and to reduce the consequence.

Safety barrier

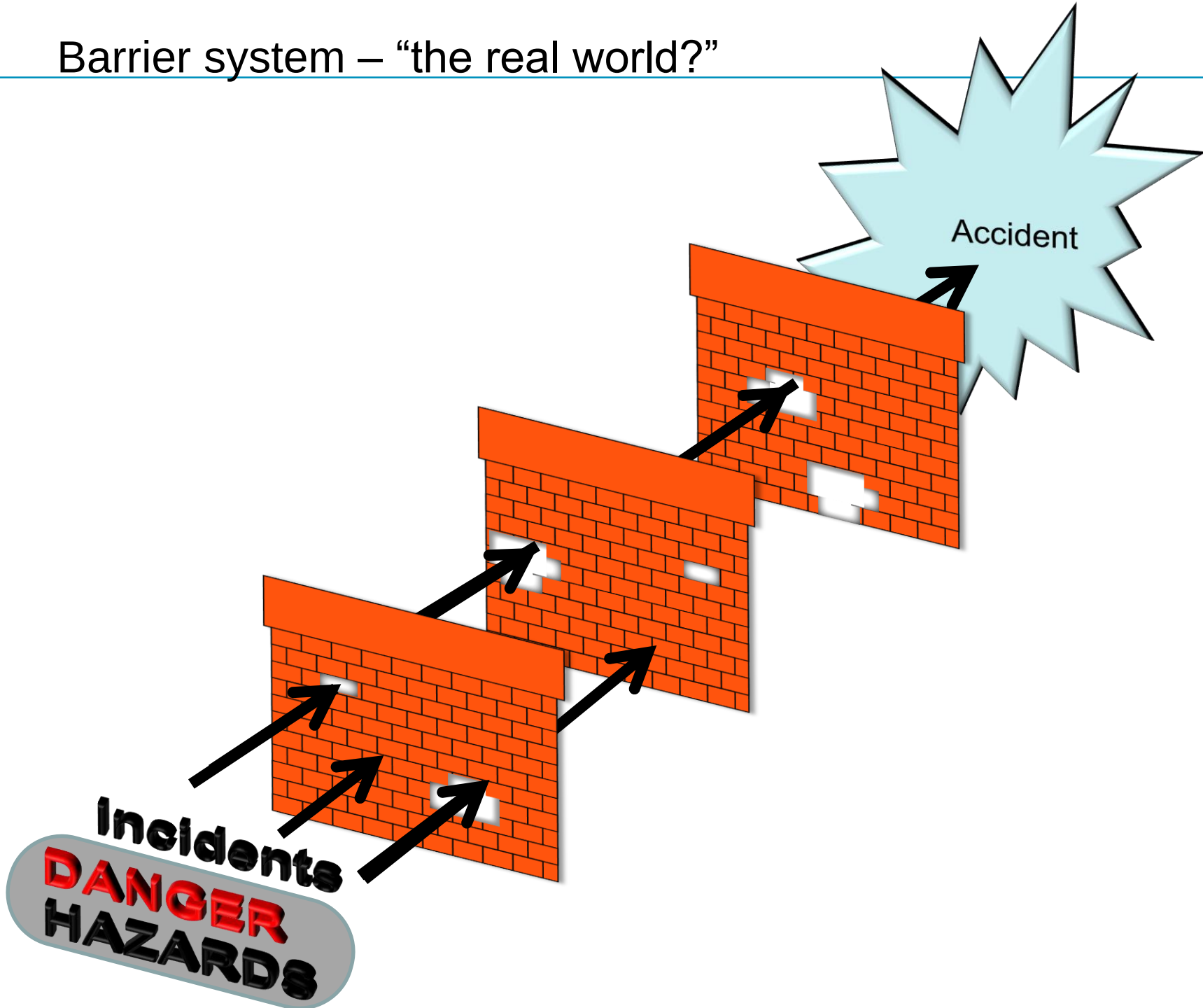
- **Physical** barrier:
  - Safety systems and equipment (i.e. Gas detection system, deluge system)
  - Alarm systems
  - Shutdown systems
  - Physical protection, (i.e. walls, PPE)

- **Administrative/ operational / organizational** barrier:
  - Inspections and safety checks
  - Check of work execution
  - Verifications
  - Emergency procedures and organization

Physical barrier is often dependent on persons as an important player (to activate, deactivate, control, etc)



Barrier system – “the real world?”



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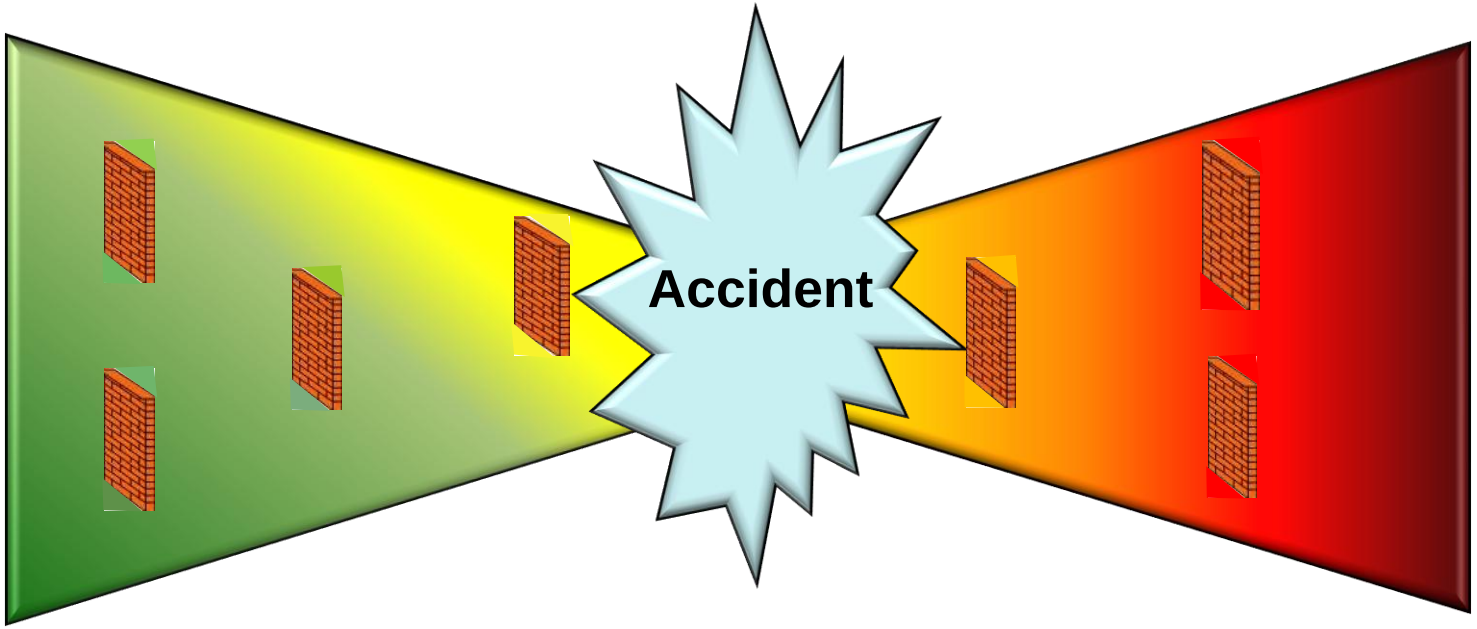
Barrier system illustrated in the bow tie

Function:

Reduce probability

Function:

Reduce consequence



Barriers can prevent or reduce the probability of an accident or reduce the consequence of an accident

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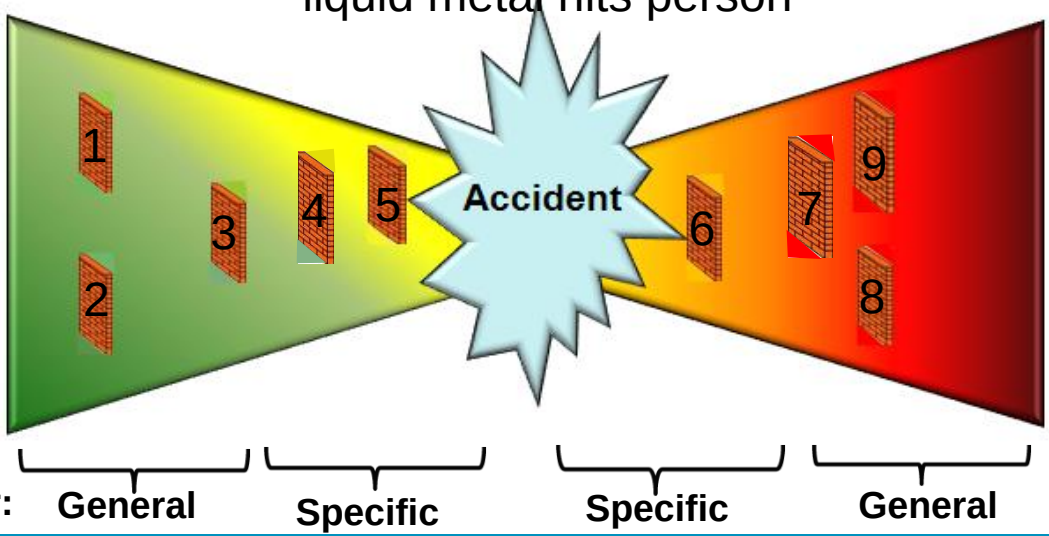
A simplified barrier – system as an example

Barrier function:
Protect people from burns by liquid metal

Barrier system:
1. Rules/norms
2. Training
3. Procedures – work instr. and traffic
4. Safety lining in MC ladle
5. Ladle/lining inspection
6. Safety clothes (flame retardant fabric)
7. Emergency shower
8. First aid
9. Medical treatment

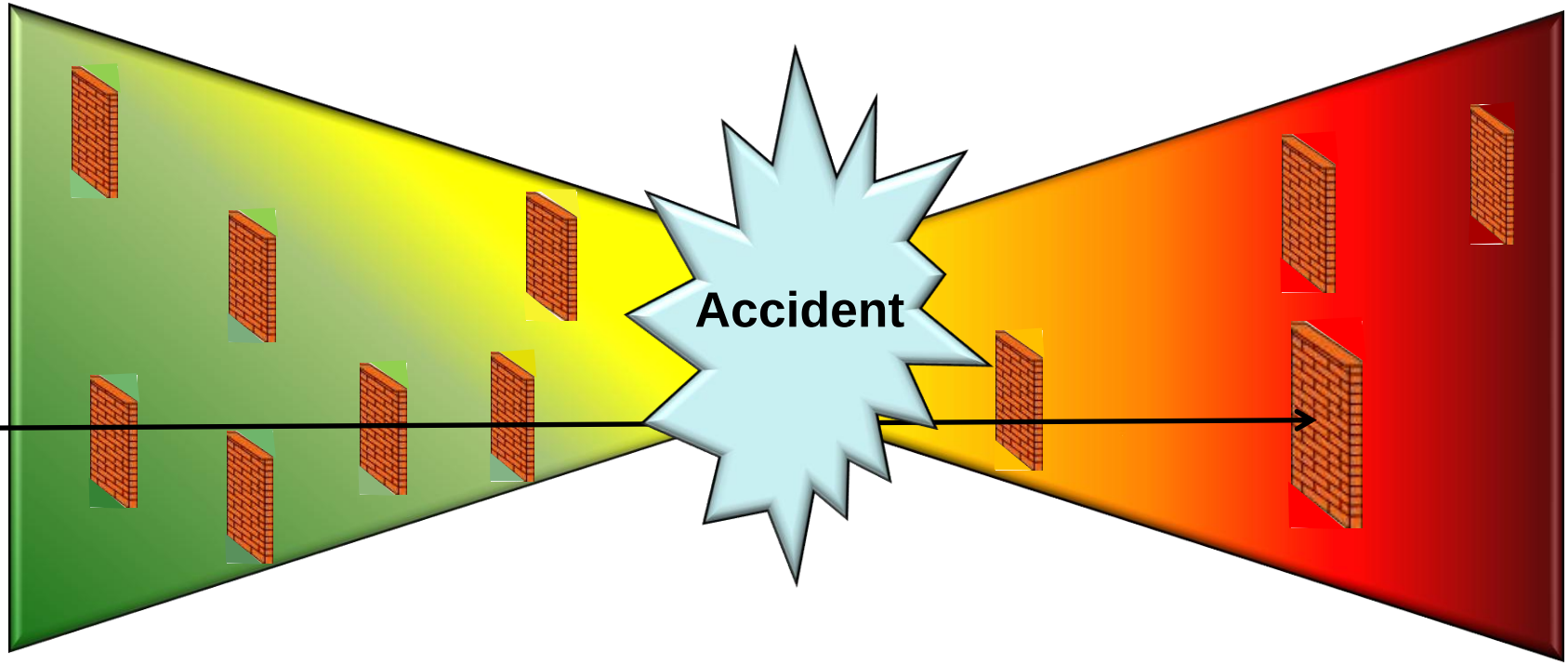
Starting point:

Accident:
Burn trough in MC ladle
liquid metal hits person



Worst consequence:
Death
(due to burns of 3rd degree)

Barrier – independencies and relations



It is important to ensure the independency of the barriers, one failure must not take out the hole barrier system.

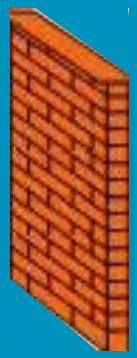
Definitions

Remark: These definitions are “boring” but important when we are going to use safety barriers to manage safety risks.

Definitions:

Barriers are measures deployed to prevent a chain of events form occur

Barrier



Barrier function
The **reason** for the barrier
Prevent event/accident
Limit the consequence

+

Barrier system
The **measure** / solution that will ensure the fulfillment of the barrier function.
Can consist of several elements

+

Barrier efficiency
How well the barrier **perform**
Is effected by i.e.:
Maintenance, recourses, competence

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Barrier system

Barrier system:

1. Rules/norms
2. Training
3. Procedures – work instr. and traffic
4. Safety lining in MC ladle
5. Ladle/lining inspection
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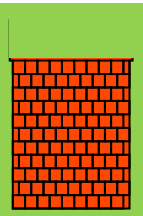
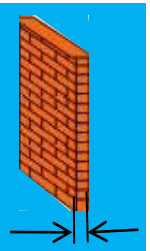


Barrier function:
Protect people from burns by liquid metal

To all the 9 system elements we must set performance standards

”Performance is influenced by:

- Renewal and maintenance of equipment
- Follow up/feedback on behavior
- Update - procedures/instructions
- Refresh – training



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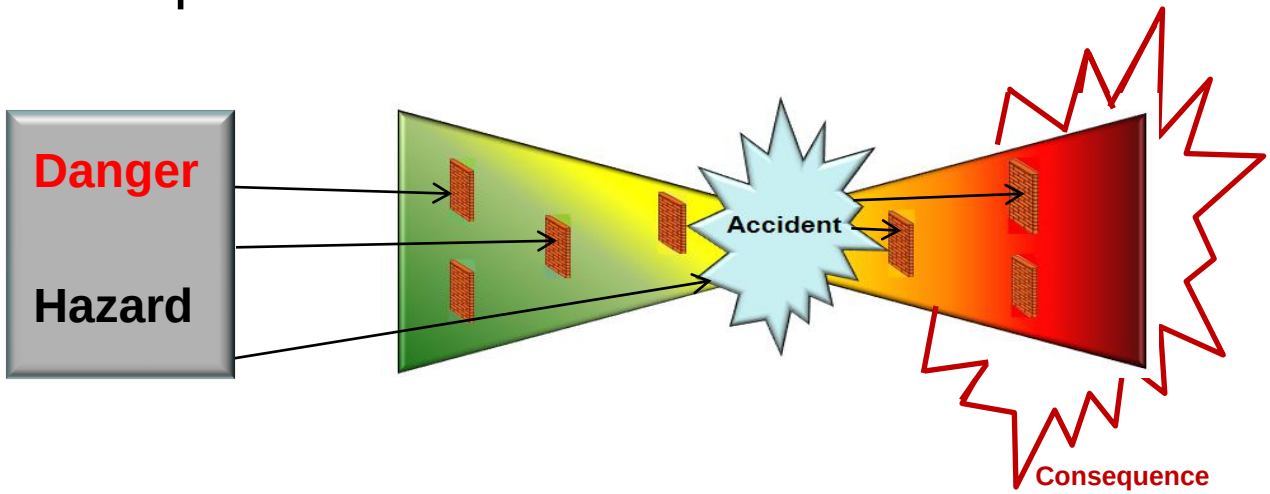
To sum up



"Working with safety we have to address the total risk, and acknowledge the complexity of our activity."

MTO:

"MTO has a **system** approach addressing the **interface** between man, technology and organization and deals with this complexity."

by: Bjørn Kolbjørnsen