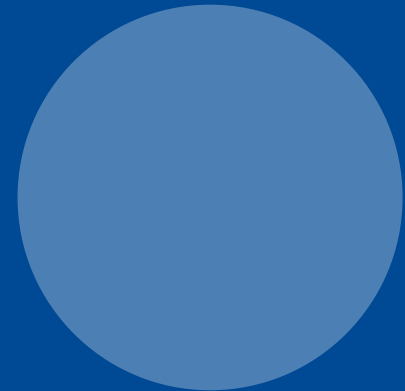


Management of Change

key aspects of misunderstanding

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Agenda

Motivation

The 1:1 exchange

The “Nearly-1:1 Exchange”

The planned change

The spoiled change

Summary and Lessons

Motivation

Seveso-Directive requires a Management of Change.
But paper is patient and man is inventive:
fancy thoughts and ugly practice

Meaning of changes

One of the common causes of accidents and incidents is the lack or insufficient understanding of the importance of change.

Often a change is not perceived as such.

"Guide to the concept of incident prevention and the safety management system" (KAS-Guide #19)

The 1:1 exchange

"Replacement 'Same by Same' is not a change.
There are no new dangers or hazards.
That's why you don't need MOC."

The 1:1 exchange

*“Replacement ‘Same by Same’ is not a change.
There are no new dangers or hazards.
That's why you don't need MOC.”*

This is basically correct –
as long as they are actually identical parts replaced.

The new spare parts

When starting a press, the shift ladder was injured by a path sensor shot from the hydraulic system.

He suffered a fracture to his forearm.

Happiness in misfortune:

the accident could have been even worse.

The new spare parts

Before the incident, the press had been dismantled and cleaned. Some components were replaced by spare parts, including the closure on the hydraulic cylinder.

During the incident investigation it turns out that the new closure had a false internal thread.

The spare part had inch dimensions, while the original component and the path sensor had a metric screw thread.

The 1:1 exchange: conclusions

In order to avoid mistakes during the exchange, repeated sensitization of the employees is essential.

The „Almost-1:1 Exchange“

"A little bit different is not so bad.

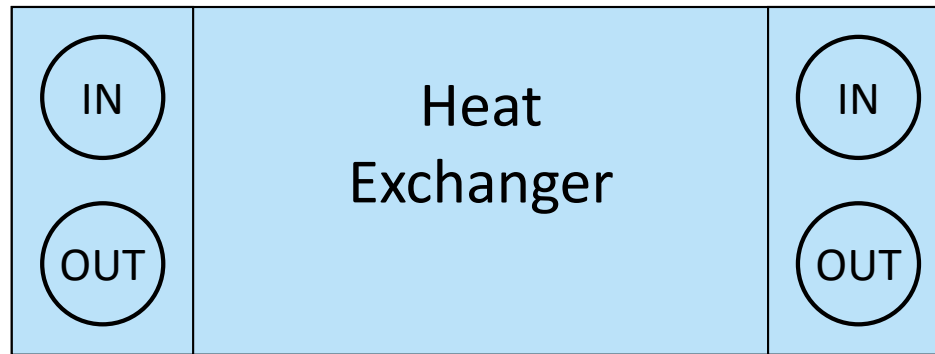
Most important is to continue operation."

The „Almost-1:1 Exchange“

*"A little bit different is not so bad.
Most important is to continue operation."*

This view urgently needs to be revised.
Even seemingly small changes can have big
consequences.

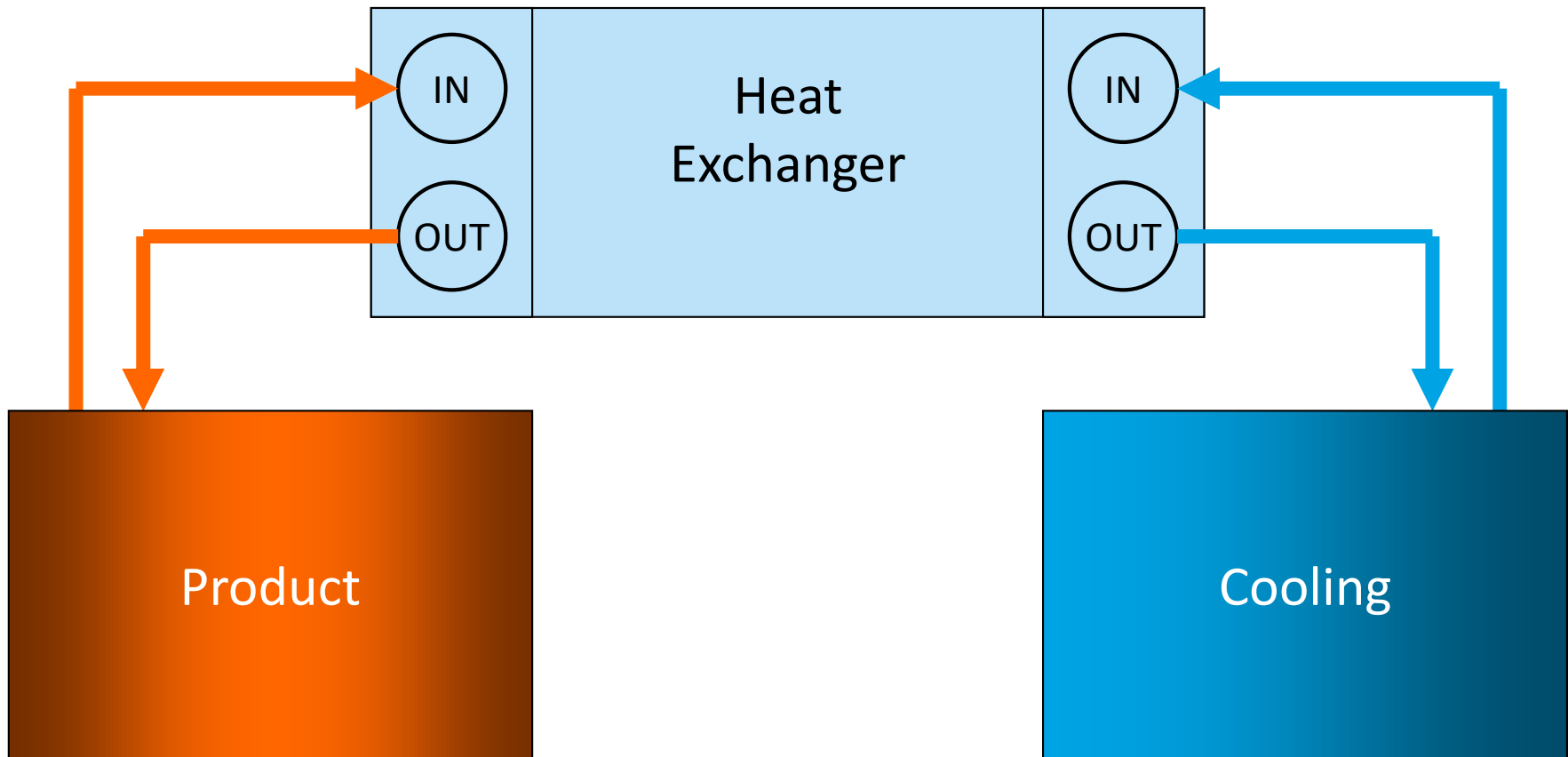
Original heat exchanger



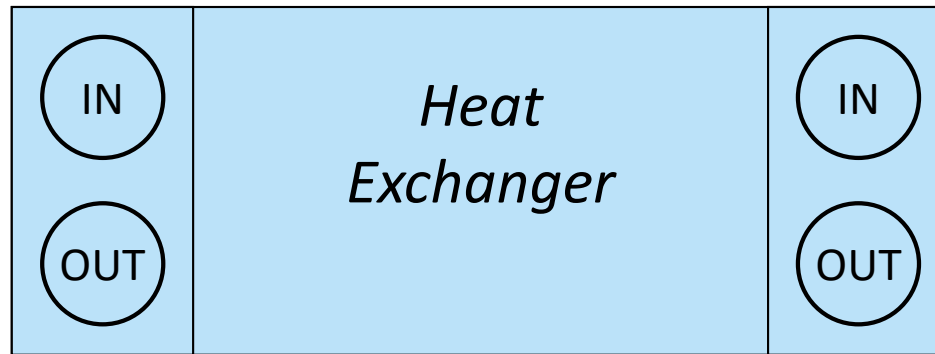
Product

Cooling

Piping of the plant



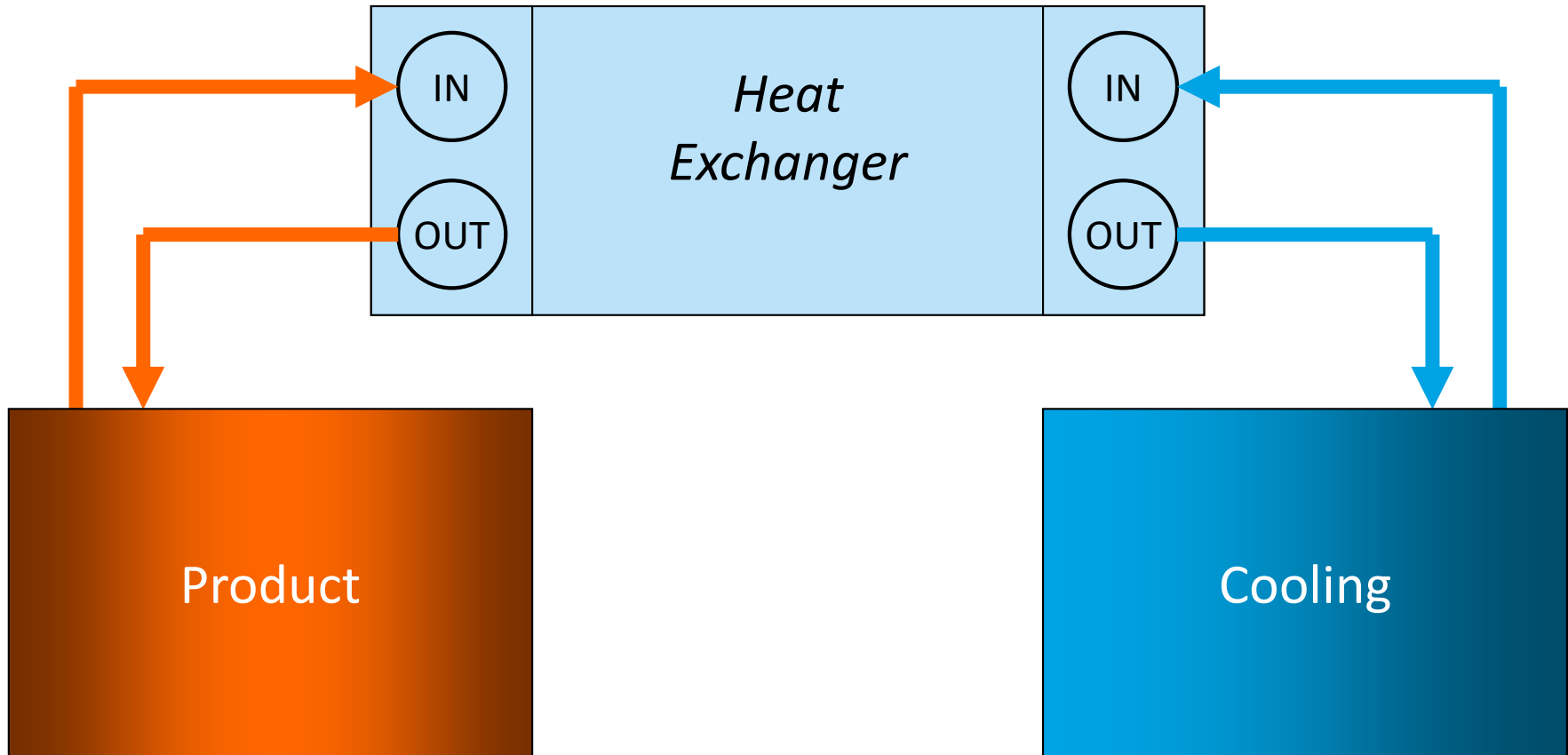
New heat exchanger



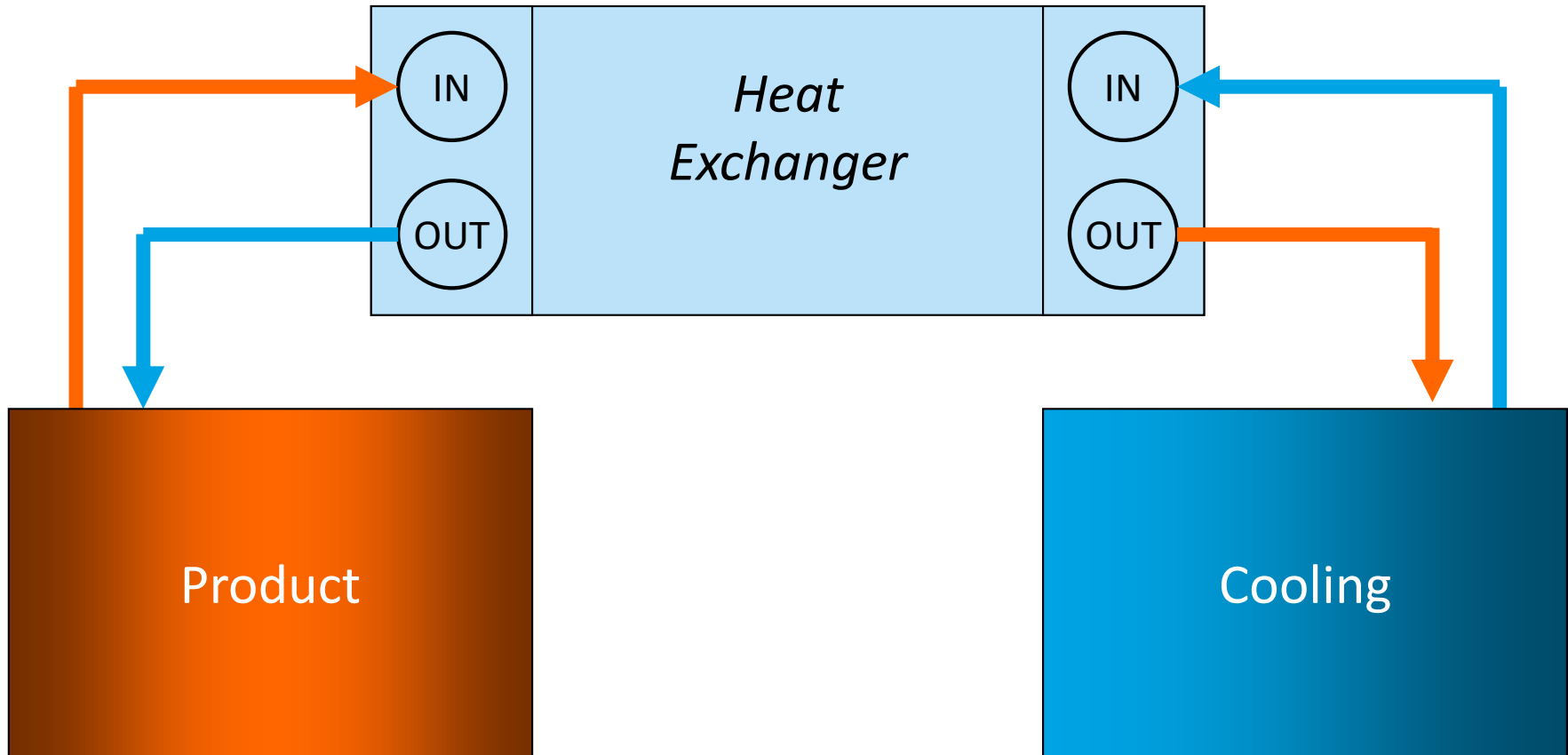
Product

Cooling

New piping of the plant



But...



The safer sight glass

In a production plant, the reflux of a capacitor could be controlled by a sight glass.

The new management assumed the sight glass as a weak point, as the system was under pressure.

The replacement for a thicker disc was ordered.

The safer sight glass

During the start-up, a product leak occurred because the sight glass was pushed away.

A thicker disc was installed, but the previous screws were reused.

Due to the thicker disc, the screws only protruded a few threaded passages into the bracket.

Thus, there was not a sufficient force.

The “Almost-1:1 Exchange”: conclusions

Even small changes can lead to severe consequences.

If something is already deliberately done differently, a MOC process must question the impact.

This requires awareness-raising and training of all persons involved in the process.

The planned change

"Our planners have everything under control."

The planned change – with unplanned consequences

Conscious changes may also fail:

When changes are thought through,
but the impact is based on false assumptions.

Change to the safety concept



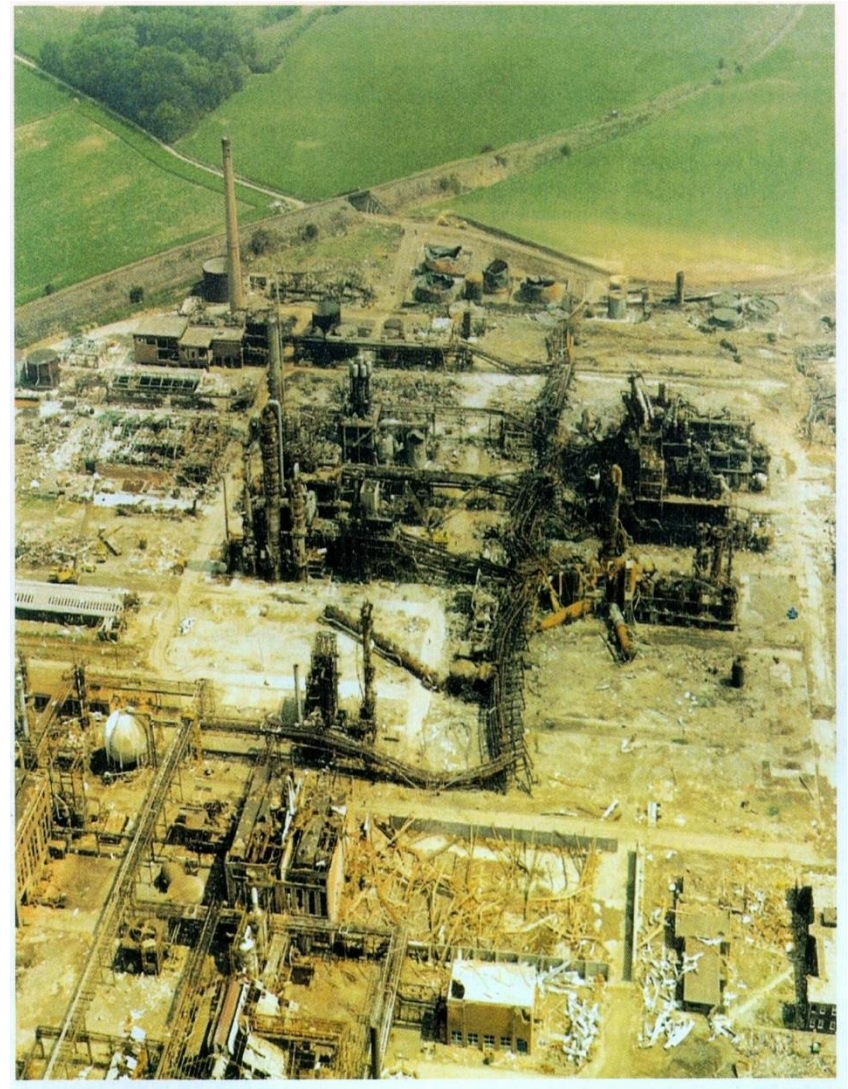
Use of provisionals

When a crack was detected at reactor 5, management decided to continue operating the plant. Reactor 4 was to be connected directly to reactor 6 via a temporary bypass line.

Since the required pipe diameters for the bypass were not in stock, pipes of a lower nominal size with compensators should be installed.



28 dead, 89 injured, devastation



The planned change with unplanned consequences: conclusions

In order to prevent changes from being based on false assumptions, it requires the involvement of expertise.

A checklist is also helpful: see e.g. [KAS-50](#).

And: Provisionals must fit the safety concept.

The spoiled change

The man between planning and commissioning

The planned and well-thought-out change – spoiled by a sloppy job

Even if a change was planned and conceived according to all the rules of art:

It doesn't mean that no events can happen.

The clogged drain

In a filler column, SO_3 distilled from oleum was absorbed by means of sulfuric acid.

During maintenance work, some fillers fell into the lower part of the column.

The clogged drain

When starting up, the fillers were flushed into the drain line and led to a blockage.

Due to the backlog of sulphuric acid up to the level of the gas inlet, there was a violent reaction.

Due to the thermal stress, the glass column broke and there was the release of SO₃.

The planned and well-thought-out change – spoiled by a sloppy job: conclusions

Effective change management includes accompanying checks before, during & after work.

Summary and Lessons

A Management of Change is useful
and is explicitly demanded by Seveso-Legislation

But...

- Not every change is covered by a MOC
(Affects mistakes at „1:1“)
- Not every change seems to be necessarily covered by a MOC
(Affects „Almost-1:1“)
- Not every change worked out according to MOC automatically guarantees complete safety
(Affects misjudged boundary conditions, sloppy jobs)

Your Questions?

