

Distribution Safety Indicator

"A potential norm to express
the safety of a gas network "

Introduction Essent Network

Turnover:

1250 Million Euro

Asset expenditure:

290 Million Euro

employees:

3300

Electricity

- 2.500.000 customers
- 100 substations 150/110kV
- 50.000 MV ring main units
- 2000 km overhead line 150/110kV
- 50.000 km Underground Cable 10/20 kV
- 70.000 km Underground cable LV
- Outage 2005: 24 minutes per customer

Gas

- 1.800.000 customers
- 100 HP groups
- 2300 LP Stations
- 15000 km High pressure (> 1 Bar)
- 25000 km Low pressure (< 1 Bar)
- Outage 2005: 1 minute per cust.

Essent Network practices R.B.A.M.



- Based on the risk position investment proposals are developed
- Only the ones above a certain yield (=risk reduction per euro) are implemented
- The Asset Management processes are certified (ISO 9001 and PAS 55)

Public perception of safety

- Several serious incidents
- Much, fast and worldwide publicity
- Dutch Safety Board criticizes safety policy
- How can we change this bad perception?



Figuur 1.1 Brandende freesmachine op het kruispunt Geregracht Levedaal



Figuur 1.1 Uitgebrande woningen aan de Czaar Peterstraat nummer 18 en 20

Positioning

The industry feels the system is as safe as it ever was.....

...but has no objective data to support the claim

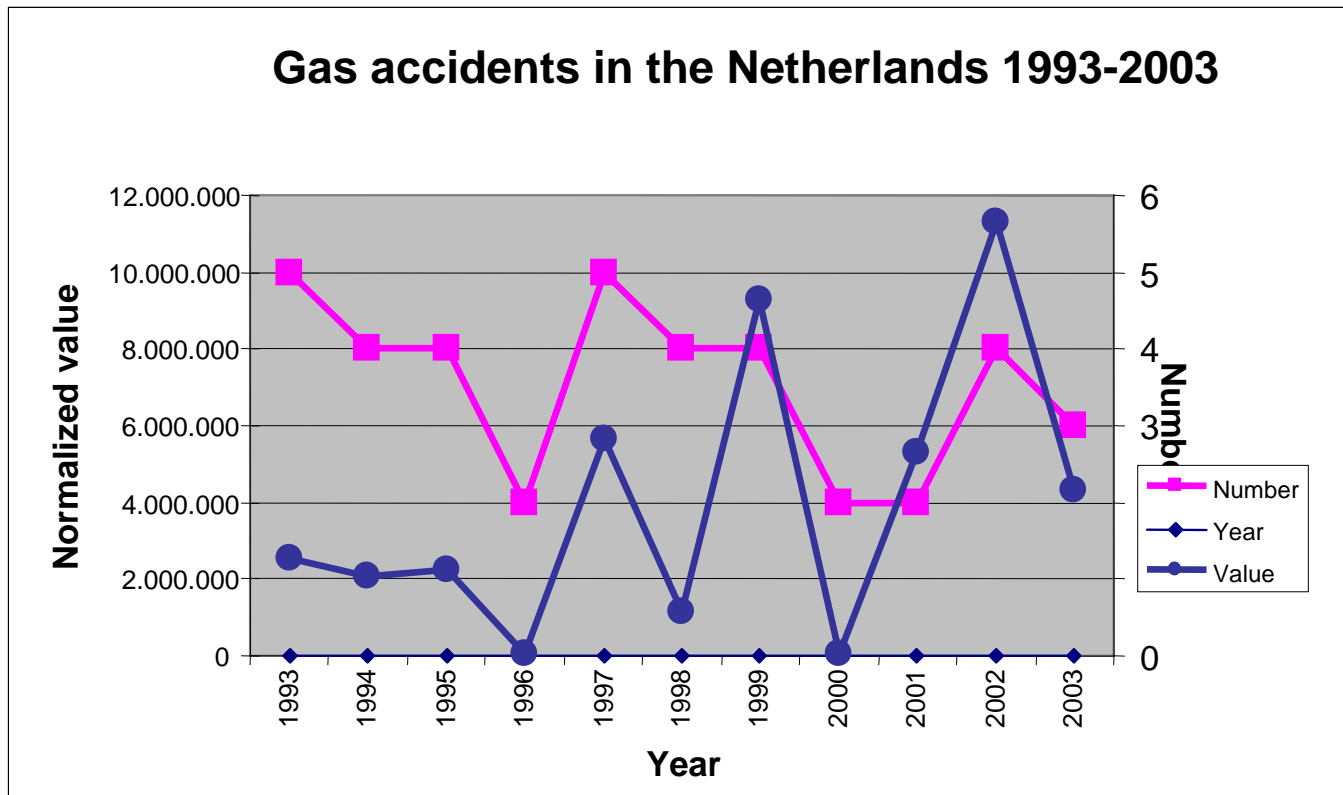
An objective indicator was/is needed!

- Robust
- Based on real incident data
- Based on weighed risks
- Facilitating investment decision

Theoretical basis

- Major value at risk: safety
- Human life valued at 10 million Euro
- Difficult to sum incidents: how much worse is a fatality than a minor light injury
- Safety incidents valued according to iceberg theory: 1 fatality equals 10000 unsafe cases
- Allows for summing incidents according to their monetary equivalent.

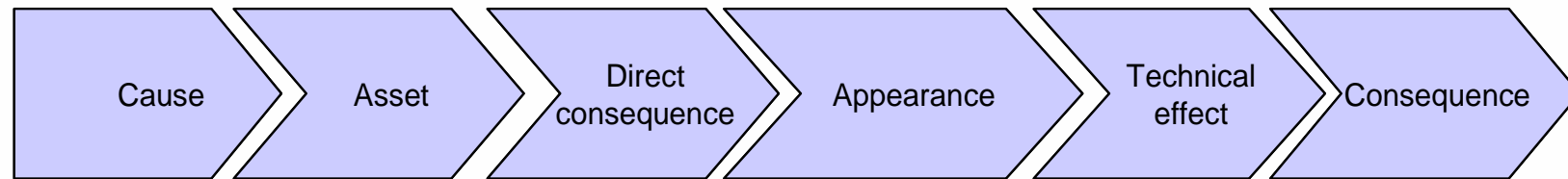
Direct assessment



The direct assessment does not show clear trends:
not robust, not facilitating investment decisions

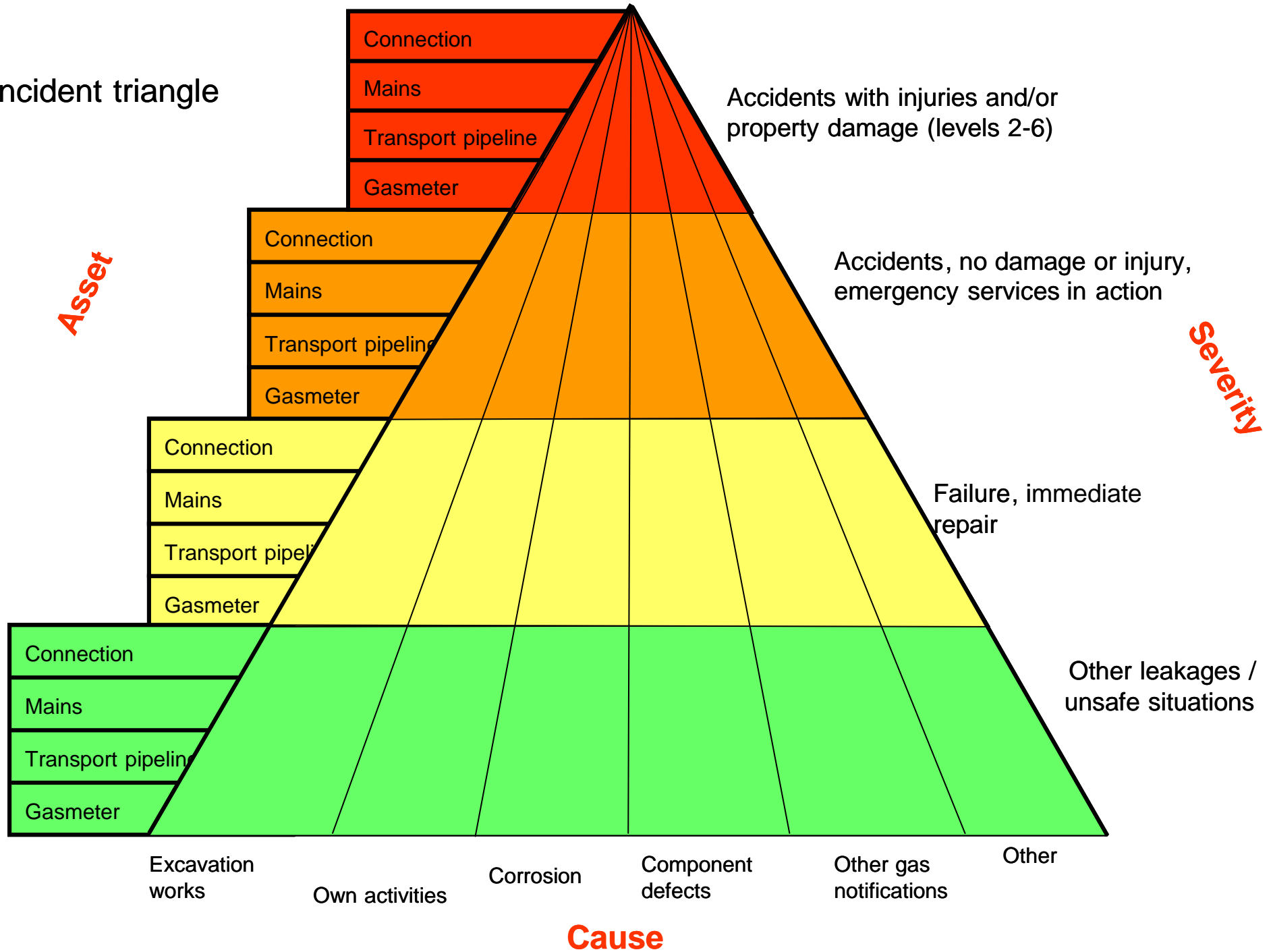
The indirect approach

- Include figures on near accidents and leakages
- Making use of the incident process



- Combined with the "iceberg theory"
- Assuming a statistical relation between unsafe situations and accidents

Incident triangle



Risk per incident type

- Each combination of asset and cause is an incident type
- For each combination the actual incidents are summed, and divided by the number of potential incidents (the leakages) in the same period
- This is the risk per incident type

Predicting safety

- Multiplying this risk by the number of incidents in a new period gives the estimated value for the total risk of the incident type
- Σ (weighed value * number of incidents) * 10.000/number of service lines
- Summing over all incident types and dividing by the number of service lines allows to benchmark network operators of different sizes
- The safety indicator is in short an indicator for the safety risk per connection

Lessons learnt

- We found a way to express safety in a number
- Registrations of incidents and leakages are very important and have to improve
- All Dutch distribution companies were interested and agreed on using the indicator
- More steps are needed to change the perception of safety
- The indicator can also be used for analyses and replacement investment decisions

An international indicator?

- The indicator counts risks and can be used, even if situations are not exactly the same
- Regarding safety, knowledge and data should be shared
- Offers a definition for international benchmark
- Better statistics by increasing the volume
- A tool in developing an international standard for registration of leakage and incidents

Collaboration thanks

- Essent colleagues Jan Flonk, Ype Wijnia, Ron van Akkeren
- Gastec R&D, especially Rene Hermkens
- Colleagues of Continuon, Eneco, Deltan
- Energiened, association of dutch energy companies

- Discussion: Which international institute or organization will carry on our initiative?