



'Normal Accidents'

Living with High-Risk Technologies



Werner Overdijk,
Crisisplan, Pisa, December 16th 2022



Who we are and what we do



Crisisplan BV:

- Initiated since 01/03/2001
- 30 jaar experience
- 8 colleague (niche company)
- Academic/praktice
- Publ.& private sector
- (Inter-)national



Crisis-:

- education
- training
- evaluations
- advise
- coaching
- planning



- **Publications** e.g. w.r.t.. strat.crisis management, leadership, resilience, disasters, infection diseases, training & exercising, aftercare



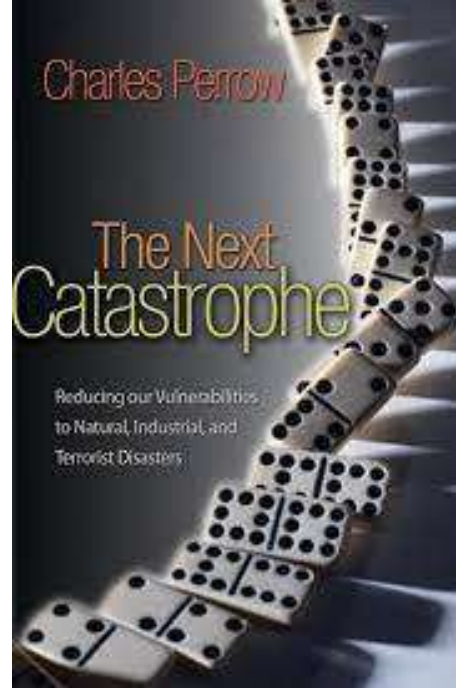
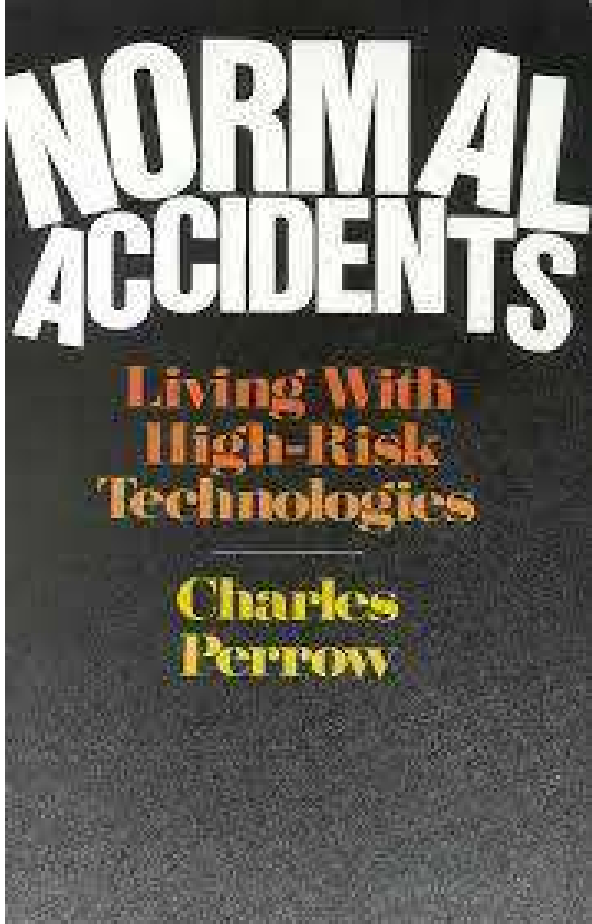
Principes:

- 'Making the difference'
- 'Evidence based'
- Top quality & integrity
- Going the extra mile'
- Constant innovation



Contractors e.g..:

- Departments, Saf.Regions, Municipalities,
- GU, TenneT, Schiphol, VZ
- ESA, ENISA, NATO
- Leiden University, Nyenrode



Charles Perrow (1984)
Inspired by The Three Mile Island nuclear accident (1979)
Characterizing societal complex technological systems have have build in multiple, unexpected and unavoidable failures!



Perrow's NAT: Complexity Bites Back

Characteristics of modern systems (e.g. industrial, nuclear, financial, energy):

1. Interactive complexity
2. Tight coupling
3. The system has catastrophic potential

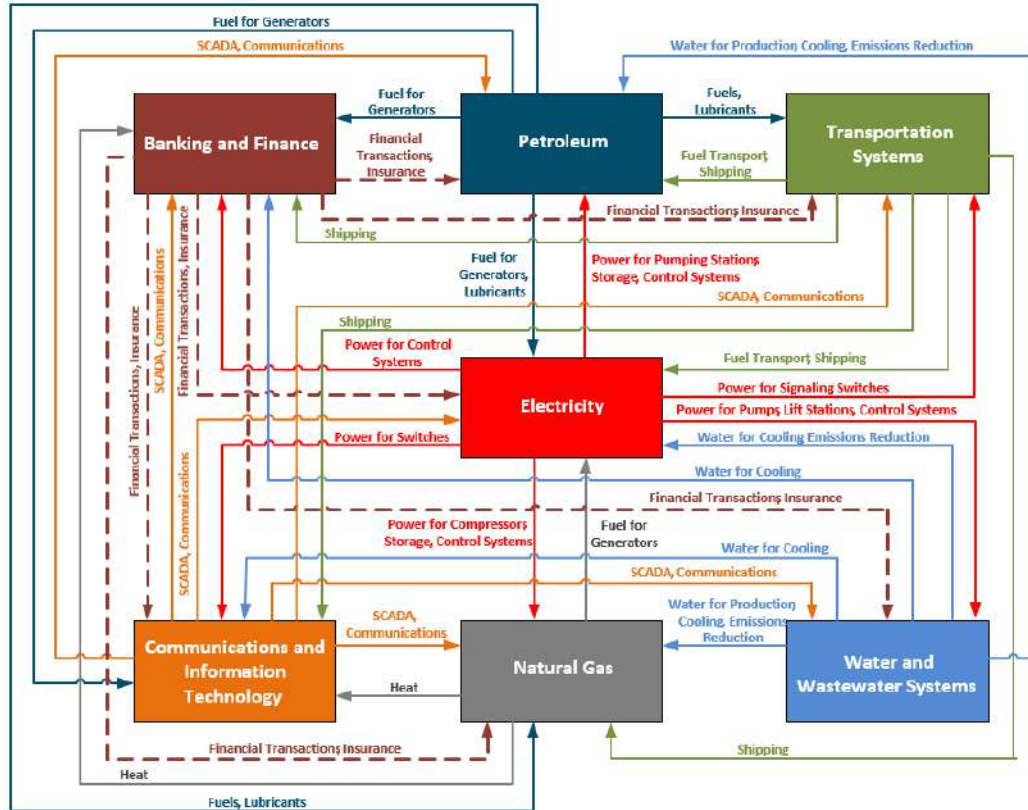
Why accidents are “normal”:

Complexity masks unforeseen, incomprehensible and uncontrollable interactions, escalation of errors is inevitable

E.g. Fukushima, TMI, Bhopal, Colonial Pipeline



Interactive complexities & tight coupling



Source: Argonne, 2017

Omnipresence of vulnerability

- Complexity and tight coupling are required features of modern organizations/systems
- Emerging vulnerabilities require new fixes...
-which typically enhance complexity
- Result: continuing arms race between two ends: efficiency and system stability



How to prevent 'Normal Accidents'?

1. Don't allow it
2. Regulation
3. Risk Management



CASE: Fireworks explosion in Enschede (I)

Facts and figures:

- 13th May 2000
- Fire and explosion in a fireworks depot (residential area)
- 23 people killed, 1000 injured, 10k evacuated, 1250 homeless
- 400 houses destroyed, 1500 damaged (40 hectare destroyed)
- Second blast up to 4.000-5.000kg TNT (impact > 30 km)
- More than 500.000 Euro of damage (Grolsch beer brewery)





CASE: Fireworks explosion in Enschede (II)

Complex and tightly coupled system that caused the disaster:

- Warehouse was built in 1977 outside of town (later low income housing)
- Fire started in a workshop complex (left open fire doors caused spreading)
- Adjacent several sealed fireworks storage bunkers (illegal sea containers)
- No adequate separation between sea containers (reduced safety)
- Illegal heavy fireworks present (audited by Inspectorate a week before)
- 180 tonnes instead of regulated 18 tonnes of fireworks
- Fire spread from bunker to containers, through connecting holes & shockwaves destroying doors causing a massive explosion



**Questions, answers or
remarks ?**

**Thank you for
your attention!**



CONTACT

LinkedIn

Crisisplan BV

Website

www.crisisplan.nl

Mail

crisisplan@crisisplan.nl

Telefoon

071 5730551

Naam

Werner Overdijk +31(0)6-53925448