

Human Error and Human Technology Interaction

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Aim of this lecture

Doctors and gun-owners

- Statistics show that the 700.000 doctors in the US kill 44.000 to 98.000 people each year.
- 80.000.000 gun owners kill 1500 people by mistake
- Doctors are 7.500 time more likely to kill by mistake than gun-owners

(Dekker, 2007)

Using cognitive labels & concepts as causes
for outcome in complex system is risky.

Causes versus labels of judgements

The operator did it!
Vs
The airplane crashed!

To explain or to label

Cases of failed operations

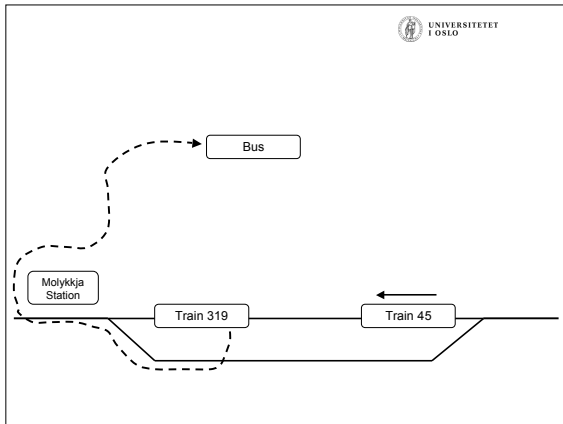
The Molykkja Incident

The Molykkja Incident

- Kl.14.25: Train 319 is held back at Molykkja station
- Kl.15.52: Train 319 is cancelled and replaced by bus transport. Passengers starts to evacuate train 319.
- Kl.16.06: Train 45 enters the Molykkja station and finds passangers walking along the tracks with their baggage. The train driver performs and emergency brake procedure and stops the train with 30 metre margin.
- http://www.aibn.no/default.asp?V_ITEM_ID=2685

The Molykkja Incident





The Molykkja Incident

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What is the cause of this incident?

- Passengers? Should not walk on the tracks?
- Conductor? Should not send people on the tracks?
- DROPS? Should have given the info to TC?
- Traffic Central? Should have answered the phone?

The Molykkja Incident

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Nice to know ...

- Heavy snow took down communication lines
- Elevated workload on Traffic Central
- Train 319 had no radio com - new train!
- DROPS called train 319

The Ingedal Incident

The Ingedal Incident

- 21th June 2006: Wagon 3368 on the CargoNet freight train travelling from Gothenburg to Alnabru, Oslo was reported as damaged.
- The wagon had major structural deviation from standard profile - causing extensive damage to track material along the travelled route
- The damage was caused kl.03.20, reported 08.45, and the train was stopped at kl.0900.
- http://www.aibn.no/default.asp?V_ITEM_ID=2038

The Ingedal Incident



The lateral safety mechanism not attached before departure, causing a blow to the container to tilt it out of position and causing further damage to the track material along the way

The Ingedal Incident



Who should we punish?

- The train driver? He should have stopped
- The cargo worker? Should used bolts

The Ingedal Incident



Nice to know ...

- Region East is a very busy track system
- The safety bolt missing was stuck
- Stuck due to lack of grease
- Salting of tracks means applying grease more often
- Shortage in resources induced fewer safety routines

The Tresfjord Accident



The Tresfjord Accident



- 19th Febr 2006: Head-on collision between car and trailer. % person in the car, 1 in the trailer. 4 casualties, 1 person w/ serious injury, 1 physically unharmed
- Driver 1: 18 yrs, (4 weeks experience)(car: 1 week)
- Driver 2: 52 yrs, (30yrs +)(trailer: 5 + years)
- The car lost friction in a curve and skidded sideways into the oncoming trailer.
- Estimated speed:
 - Car = 70 km/t, trailer = 50km/t
 - Impact speed: 120 km/t
- http://www.aibn.no/default.asp?V_ITEM_ID=2642

The Tresfjord Accident



The Tresfjord Accident



Human Error?

- Driver! Lost control, drove too fast, in a hurry
- Other possibilities?

The Tresfjord Accident



Nice to know

- Driver 1 had two documented driving lessons before getting the license - by his own will.
- At the time of accident, the sun was shining towards the young driver - creating glare
- Roads are narrow - and with snow/rain - even more narrow.
- New car that was heavily loaded ... Driven by a new driver

The Gjedrem Accident

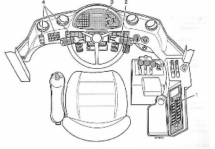


The Gjedrem Accident



- 24th November, 2006, kl. 10.04
- A truckloader was driving along E39 in Rogaland as part of transport between work sites.
- During driving, the chauffeur accidentally touched a controller for changing the drive mode of the truckloader. As a result of trying to pull the controller back, the truckloader turned sharp left into an oncoming vehicle.
- Impact speed estimated to 130 km/h
- Parents and 1 child died. 2 children were severely injured.
- http://www.aibn.no/default.asp?V_ITEM_ID=1979

The Gjedrem Accident



The Gjedrem Accident



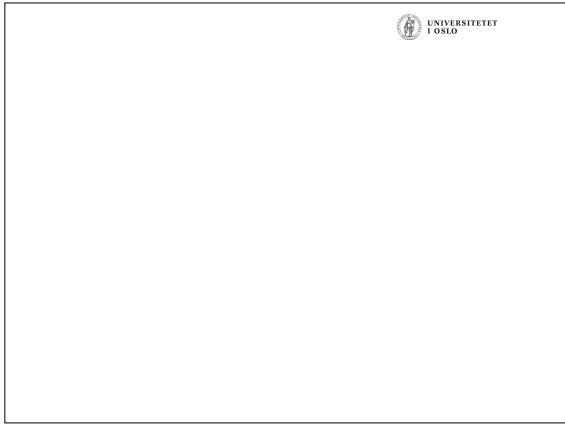
- What caused the accident?
- The driver! Turned the truckloader into the car

The Gjedrem Accident



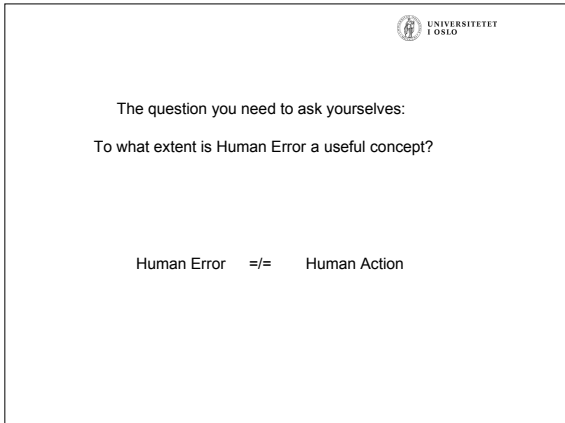
Nice to know

- The new truckloader model has removed the locking of comfort mode driving - driver had experience from older truckloaders
- Previously not possible to activate during motion - technical change was not communicated to driver
- Thick jacket due to cold weather - did not feel the controller being touched

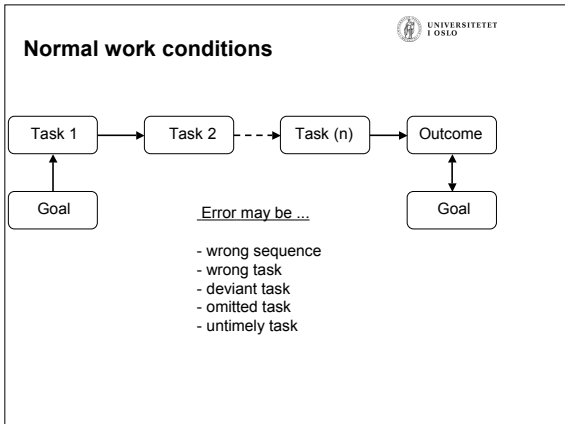


The question you need to ask yourselves:
To what extent is Human Error a useful concept?

Human Error \neq Human Action

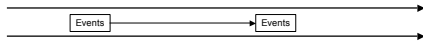


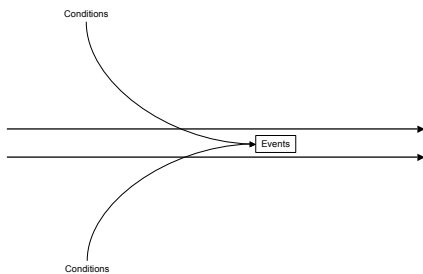
Normal work conditions

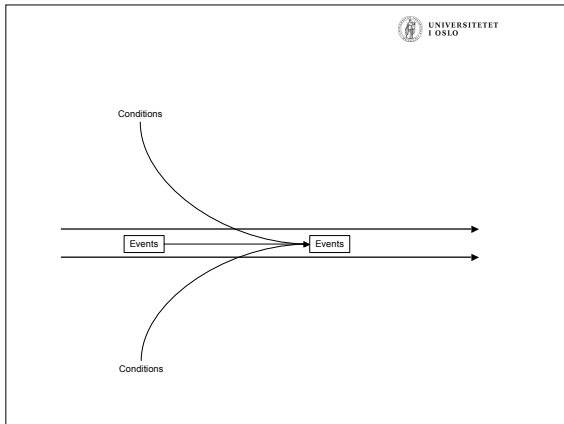


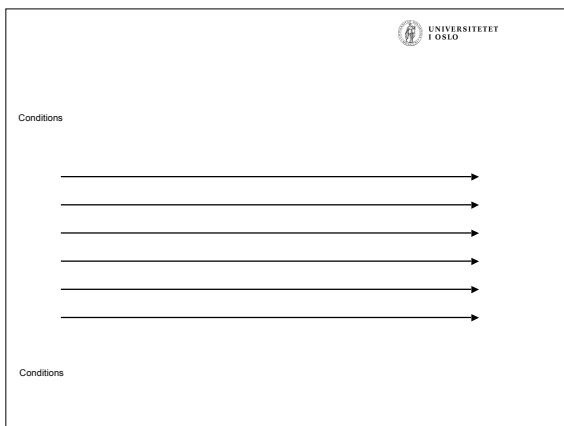
Modern work conditions

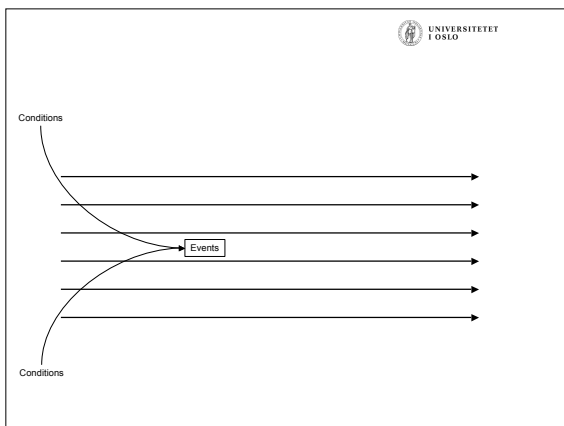
- Changing goals: The objectives alter along the way
- Disturbances: Always abnormal conditions
- Variance: Your tool works differently all the time
- Keyhole: You dont have all the information
- Multiple outcome: Consequences are exponential

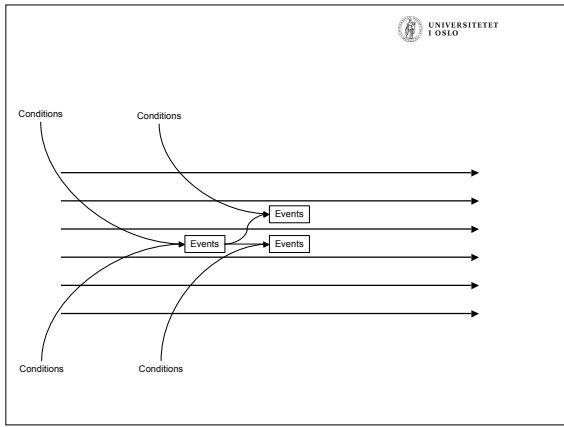


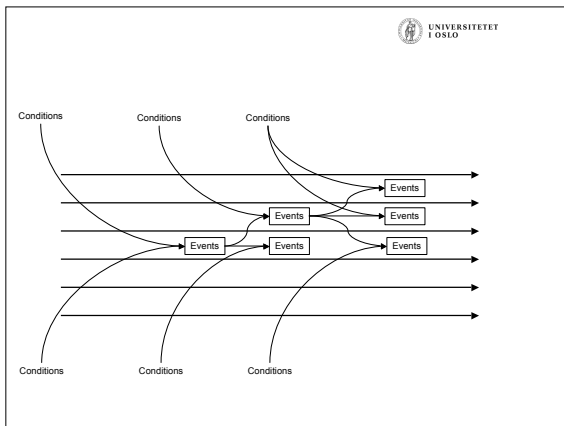


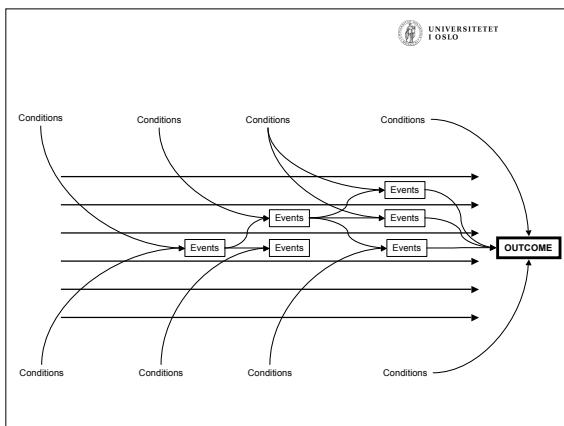


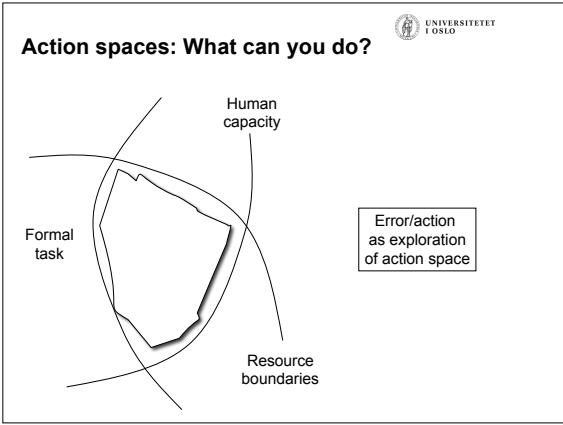


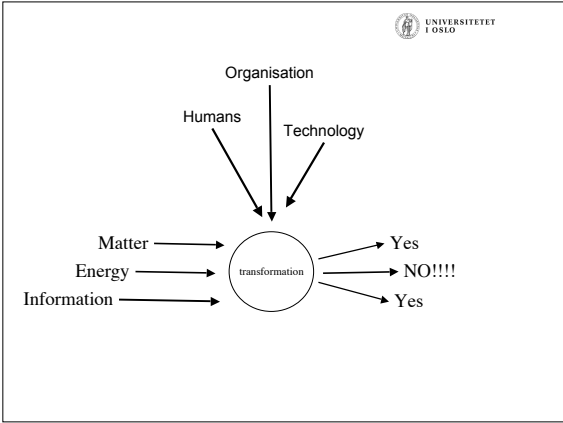


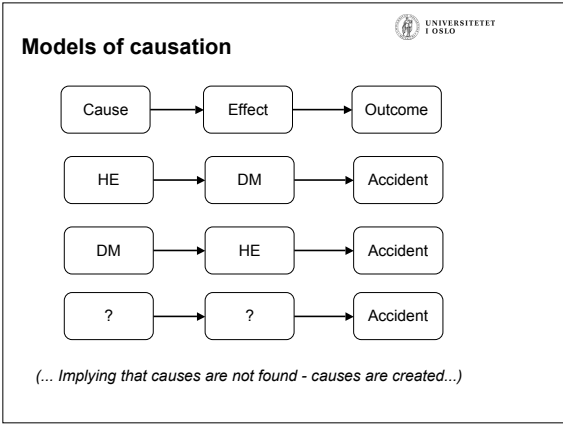












Doctors and gun-owners, revisited

- Doctors are 7.500 time more likely to kill by mistake than gun-owners (Dekker, 2007).
- How do we count errors?
- What assumptions are necessary?

Useful assumptions?

- Systems are safe - people make them unsafe
- Error are causes in causal relationships
- The situation 'then' is the same as 'now' (hindsight)
- There exists clear and obvious goal states
- People have a choice and have the means

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