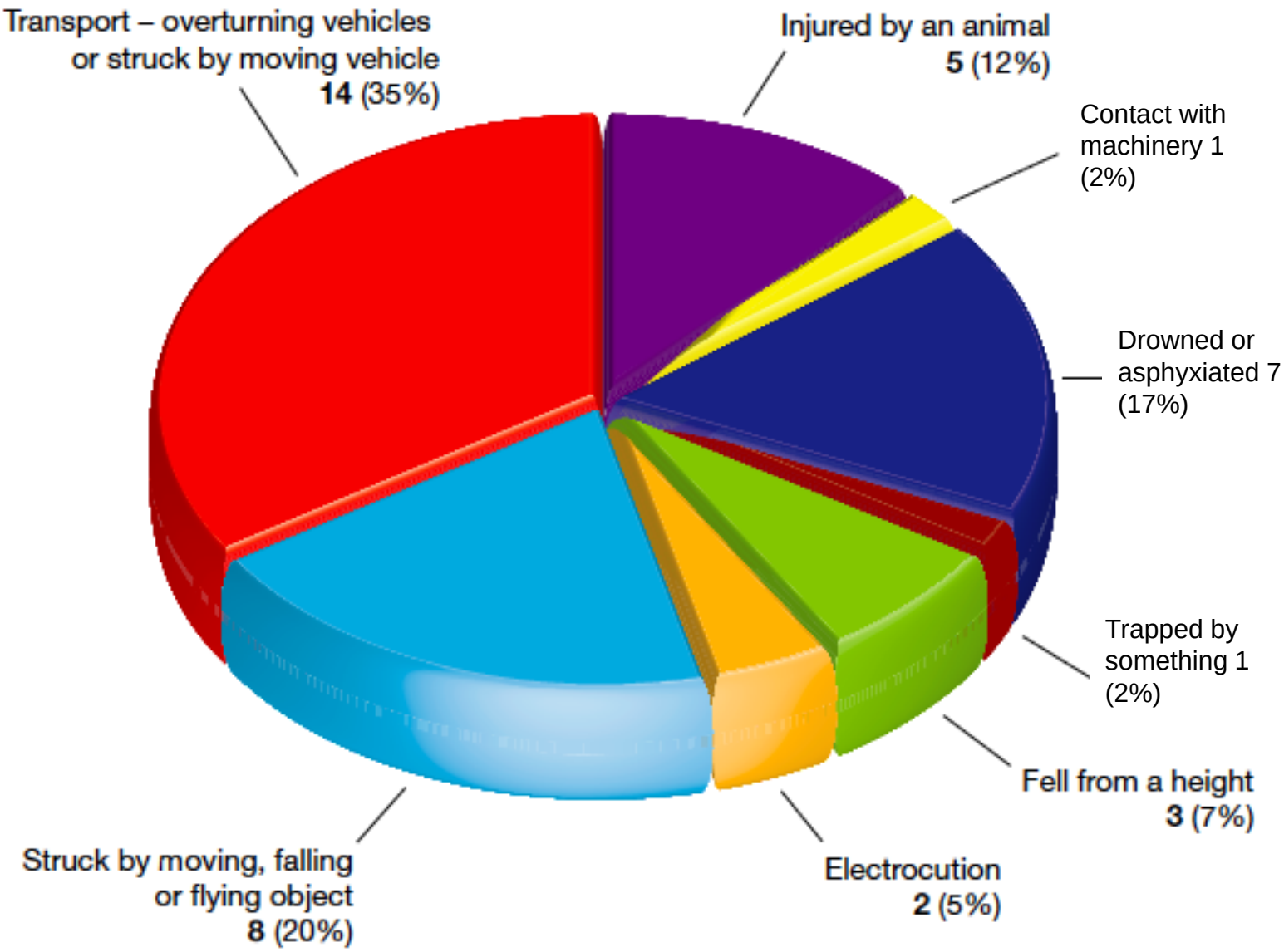
Causes of accidents in the land-based industries

The human factor

Introduction

- Health and Safety has got a bad name
- Mainly in how non-experts assess *insignificant* and *trivial* risks
- Fed by compensation culture NOT legislation
- Public-facing organisations becoming risk averse
- Not lose sight of those risks that have the potential to be life shortening/limiting

FATAL ACCIDENTS IN AGRICULTURE 2011/12



Land-Based Fatalities 2011-12

Struck by moving vehicle	14
Tractor	5
All Terrain Vehicle	3
Telehandler	2
Forestry forwarder	1
Turf harvester	1
Truck and trailer	1
Cattle lorry	1

Land-Based Fatalities 2011-12

Struck by moving, falling or flying object	8
Tree/tree branch	3
Potato box	1
Post rammer	1
Timber/door	1
Grain mill	1
Locking ring	1

Land-Based Fatalities 2011-12

Drowned or asphyxiated	7
Water	4
Slurry	2
Grain	1

Background

- 1980’s history of vehicle accidents
- Research identified accidents on slopes
- Initial research only looked at 50%
- Well intentioned but flawed
- Human factors
  - *Human error*
  - *Risk homeostasis*

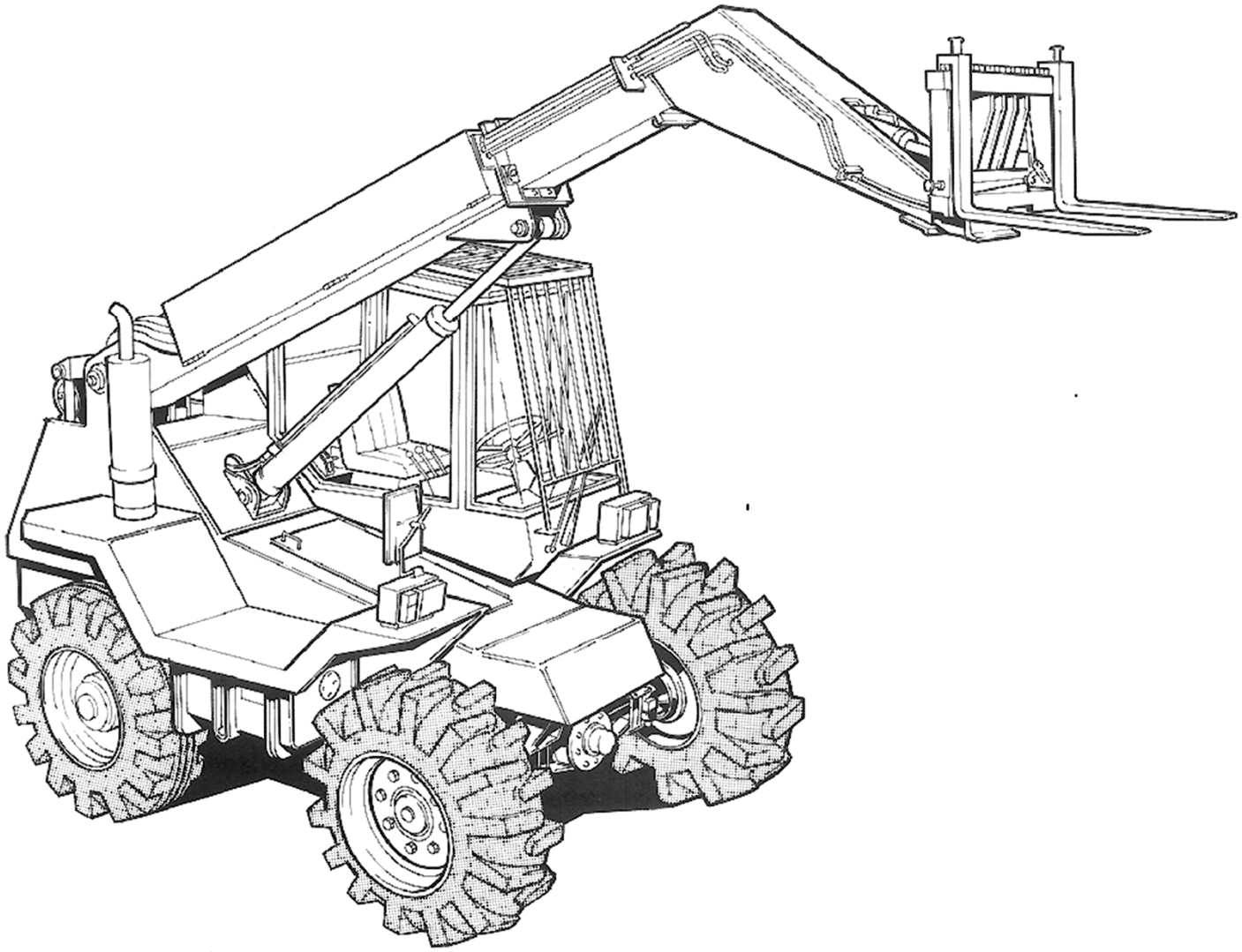
Vehicle Types

- The types of vehicles to include:
  - self-propelled vehicles
  - FLT's
  - mobile work equipment
- Blurring of boundaries between vehicles used in different industry sectors

Range of Vehicles

- Mobile cranes
- Agricultural tractors
- All Terrain Vehicles
- Mechanical handling equipment
- Construction vehicles
- Miscellaneous other ‘works’ vehicles

Telescopic MH




Danger
Deep excavations


JCB
((TELESCOPIC))


LONG
VEHICLE
STRIMECH


JCB
TELESCOPIC


6

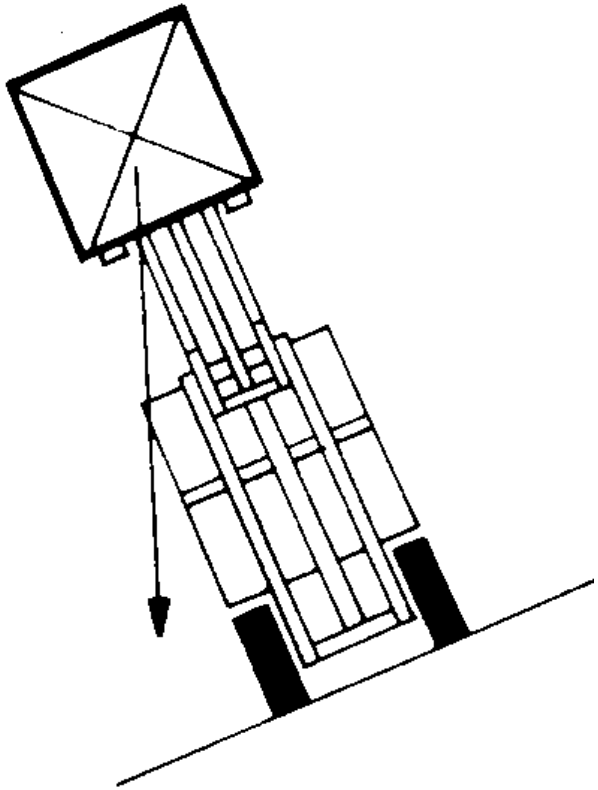

Q940
RAE
3

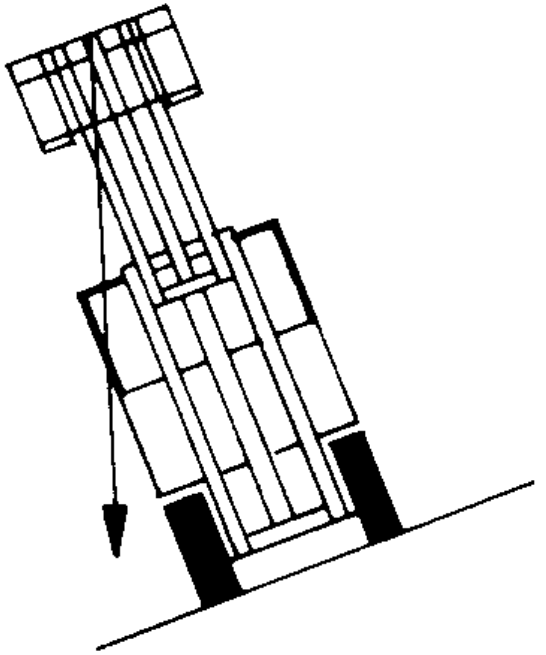

4

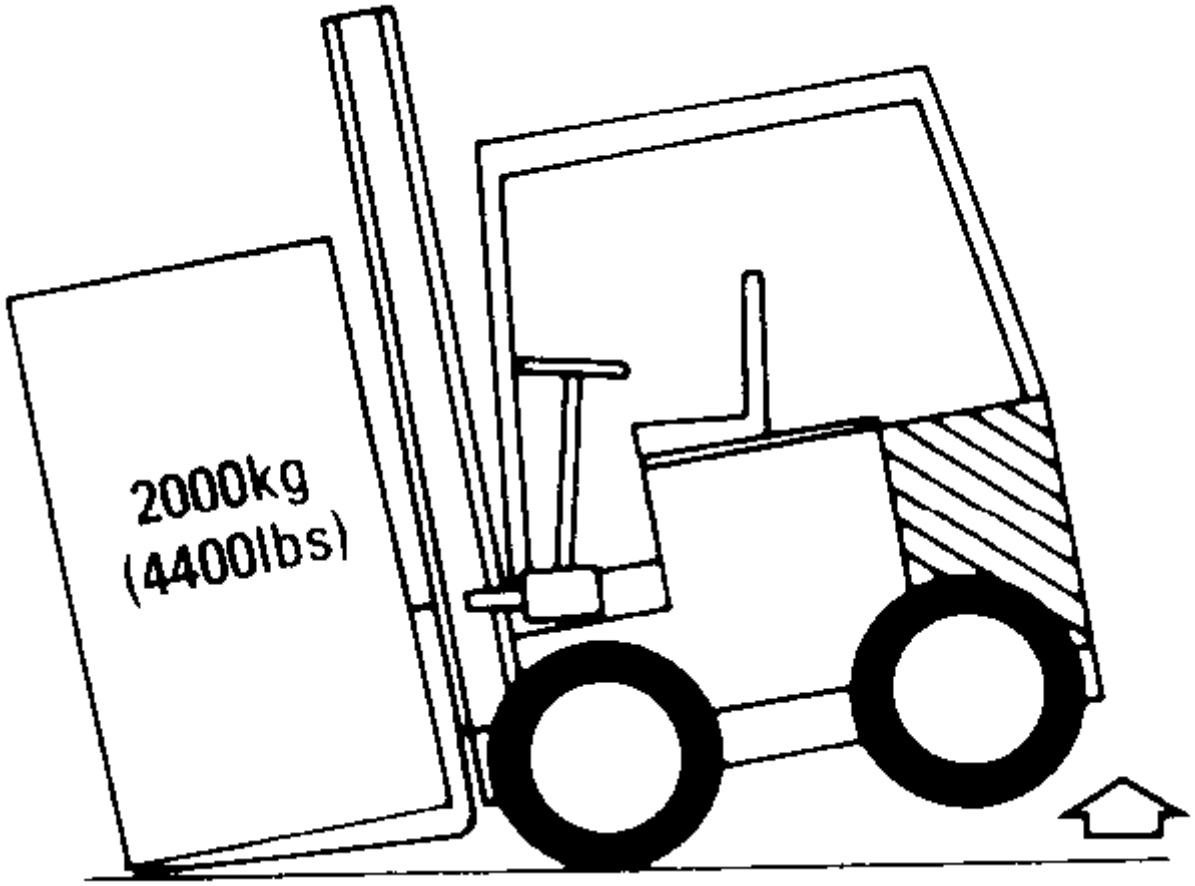
Hunter et al

- Identified three technical causes of overturns in agriculture
  - Lateral
  - Longitudinal
  - Control loss

Lateral Instability





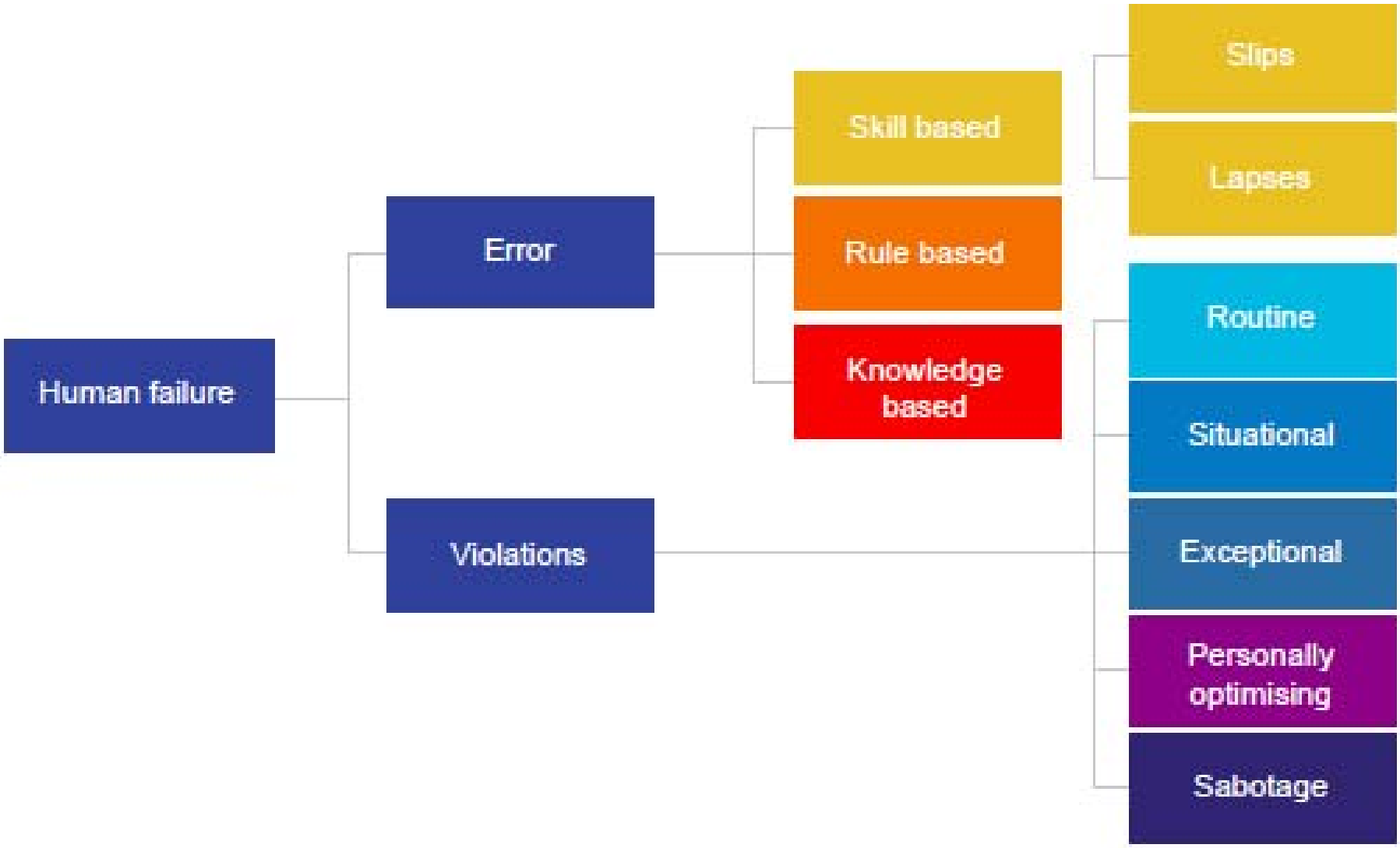

2000kg
(4400lbs)

Risk Homeostasis

- Change behaviour in light of new circumstances
- Although the degree of risk taking unchanged

Role of Human Error

- Skill-based
- Rule-based
- Knowledge-based
- Violations


Human failure
Error
Violations
Skill based
Rule based
Knowledge based
Slips
Lapses
Routine
Situational
Exceptional
Personally optimising
Sabotage

Skill-Based Error - Reduced Intentionality

A tractor driver was spraying a field of carrots when the 24m spray boom came into contact with 33KV overhead cables. He had been trying to move around an electricity support post when he accidentally raised the booms into the cables.

Rule-Based Error - Inappropriate Use of a Normally Good Rule

"As he tried to leave the cab, he was electrocuted."

Knowledge-Based Error – Lack of training

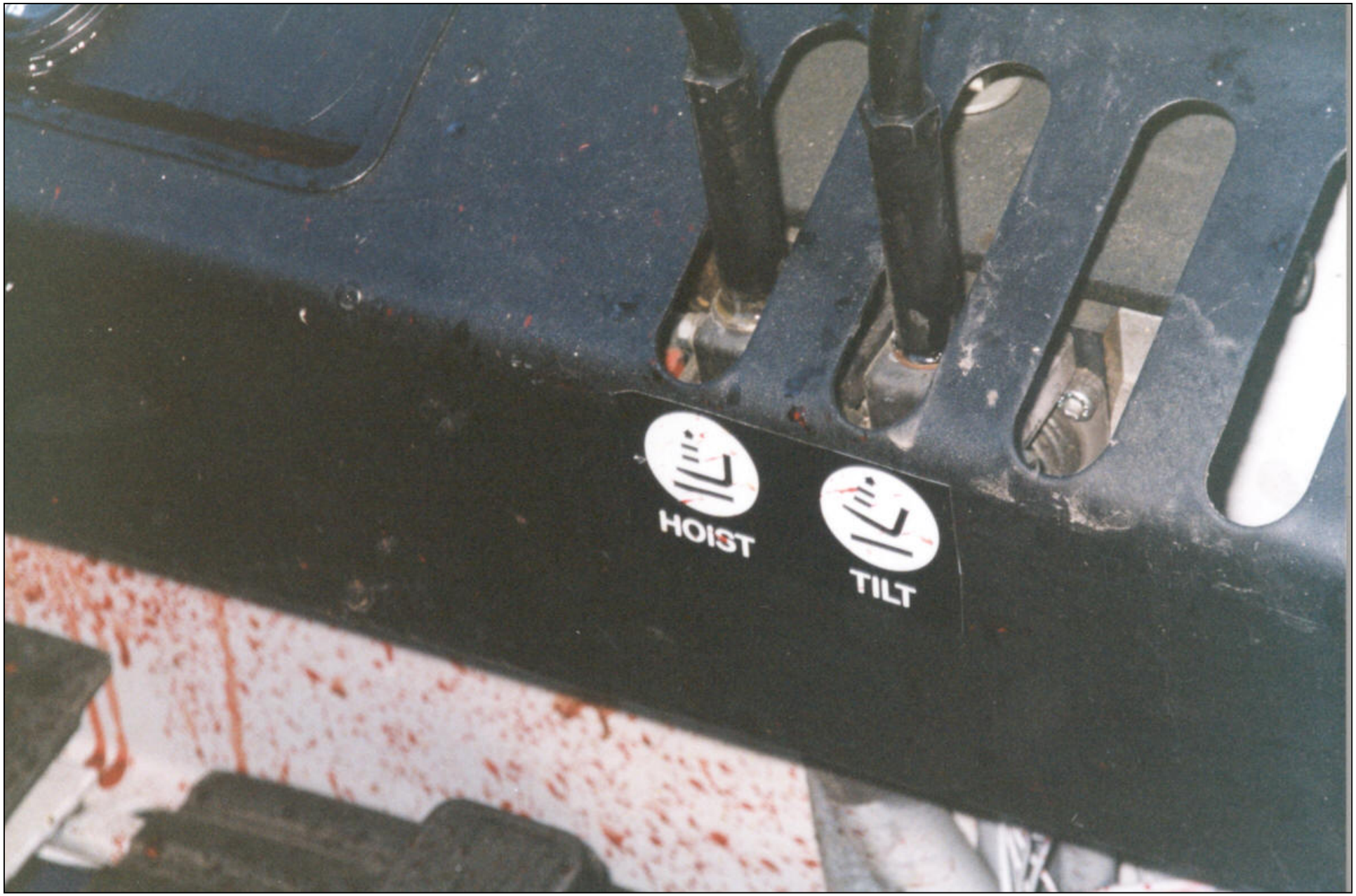
"As he jumped clear of the cab he was crushed by the overturning vehicle."

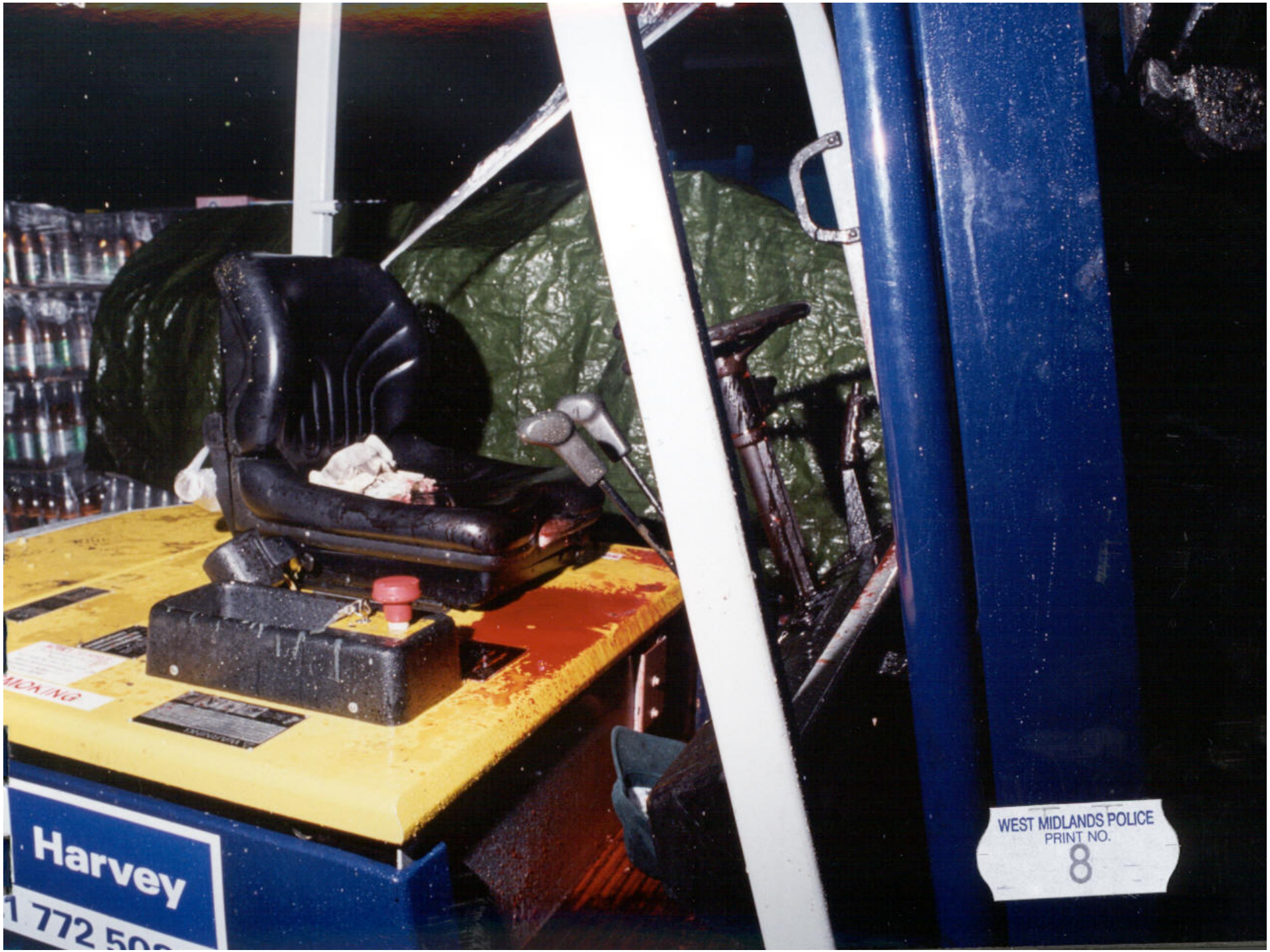

5

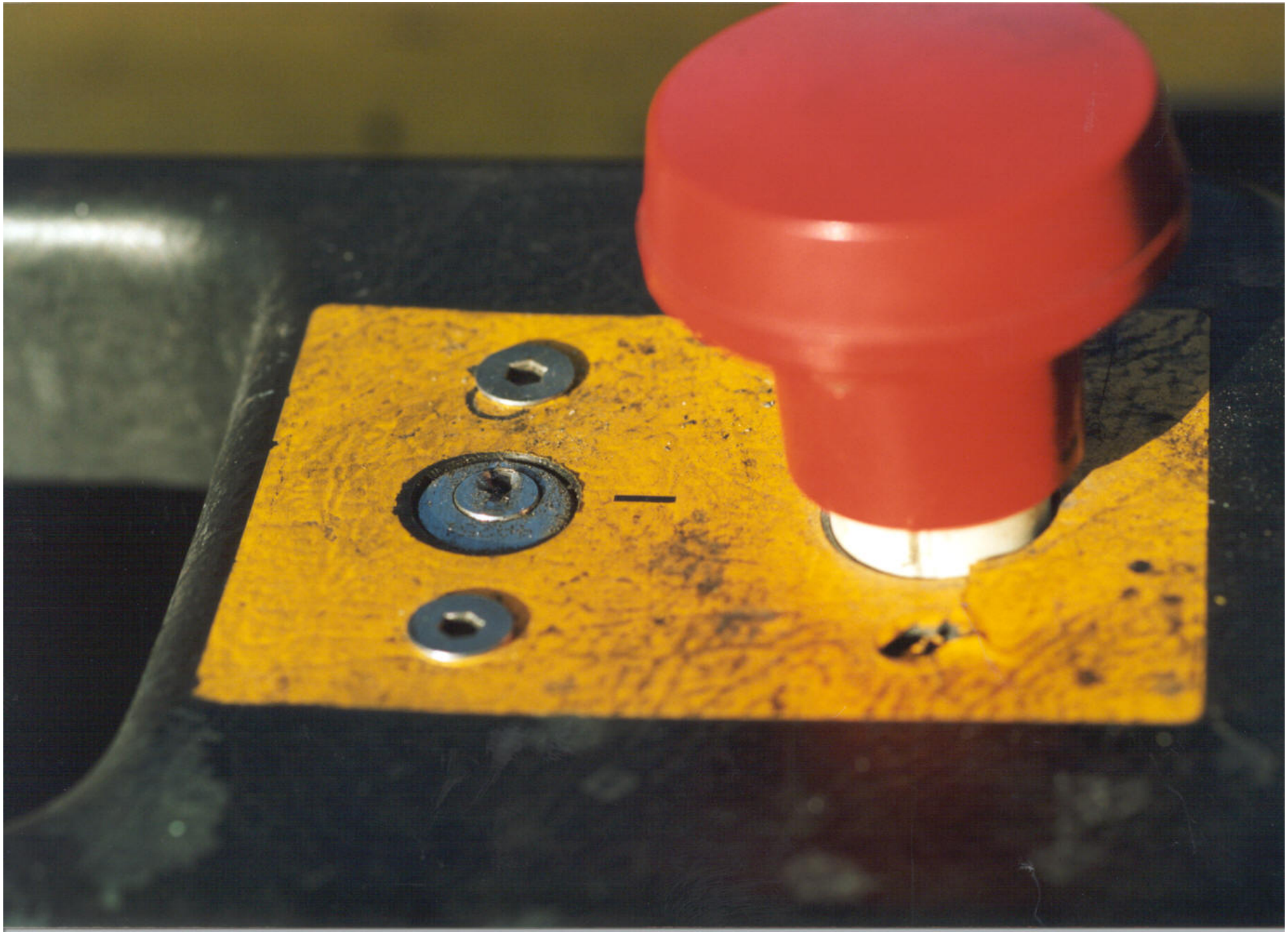
Violations - Routine/situational/exceptional

"Non-compliance with rules, regulations or procedures"


WEST MIDLANDS POLICE
PRINT NO.
7


HOIST
TILT


Harvey
WEST MIDLANDS POLICE
PRINT NO.
8



Conclusions

- 9 out of 10 fatal accidents (all industries) unobserved
  - Co-workers *shape* behaviour of colleagues
  - Lone workers particularly at risk
  - Older workers likewise
- Land-based industries continue to be a major area of concern
- Other industries have learned from us, we can also learn from them

Conclusions

- Technical models provide incomplete explanations of accidents;
- Human error models assist;
- Combined understanding essential;
- Basic concepts of *human error* key component in training of engineers.