Health and Safety

- Definitions of accidents
 - Pheasant (1991) defines an accident as an unplanned, unforeseen or uncontrolled event, generally one which has unhappy consequences.
 - He argues that an accident may be caused by a combination of unlikely circumstances that cause an unexpected event.
 - He also argues that accidents are either caused by 'unsafe behaviour' or by 'unsafe systems' in the work place. With thr former it becomes necessary to change the behaviour and with the latter to change the system.
- Causes of accidents
 - Reason (2000) differentiated between 2 main types of errors in the workplace that can cause accidents:
 - Theory A is when an individual may be to blame. (individual/person approach)
 - Theory B is when work systems may be to blame. (system approach)
 - On the afternoon of January 4th 2001, a day case patient at the Queens Medical Centre (QMC) in Nottingham turned up for his chemotherapy treatment. Under the supervision of a Specialist Registrar, a Senior House Doctor correctly gave the patient a drug (Cytosine) directly into the spine. A second drug (Vincristine) was then also administered by the same route. Unfortunately, this drug should have been given intravenously, and despite the efforts of the medical staff the 19-year-old patient died.
 - How could this happen? How could two experienced, specialist doctors make what appears to outsiders to be such a basic error? The inquiry into the accident (D0H, 2001 d) highlights how professional mistakes (personal causes of error) and the procedures and equipment (system causes) contributed to the death. It was already known that there was a danger of giving Vincristine into the spine because it had happened before. As a result it was part of good practice at the QMC to give the two treatments one into the spine

and one into a vein — on different days, but this procedure was not always followed, especially when patients had a history of missing appointments. Also, the manufacturer of Vincristine provided labels to be attached to the syringes which said 'Not for intrathecal use — For intravenous use only. However the QMC staff did not use these labels because they believed they had the potential to confuse people. The inquiry also noted that the syringes for both injections looked very similar and that the labels were both in black type.

- Although these system explanations do not explain the accident, they do give some pointers to the ways in which similar mistakes can be avoided.
- Examples of accidents
 - Theory A (individual) errors- Three Mile Island (1979) nuclear meltdown was reported as an accident due to 'valve malfunction' (system error) but was really a result of errors made by the operator. The mechanical failures were compounded by the initial failure of plant operators to recognize the situation as a loss-ofcoolant accident due to inadequate training and human factors.
 - Theory B (system) errors- The Chernobyl (1986) nuclear disaster and the Fukushima Daiichi nuclear disaster (2011) were both caused by system errors. In the Chernobyl disaster, a catastrophic power surge led to explosions in the core of a nuclear reactor. In the Fukushima disaster, an earthquake and tsunami produced equipment failures and without this equipment a loss-of-coolant accident followed with 3 nuclear meltdowns and a release of radioactive substances into the environment.
- Accident proneness and personality
 - Accident proneness is a personal idiosyncrasy predisposing the individual who possesses it to a relatively high accident rate.
 - Robertson et al (2000) devised a questionnaire to assess accidentprone personality and believe there are 3 important determinants:
 - Dependability- the tendency to be conscientious and socially responsible.
 - Agreeableness- the tendency not to be aggressive or selfcentred

- Openness- the tendency to learn from experience and to be open to suggestions from others
- People are also thought to have accidents due to certain personality factors:
 - Age- Young people have most accidents. There is a decline between 25 and 45 before there is a slow increase towards old age.
 - Cognitive abilities- accident-prone drivers may have field dependence (they are not very good at extracting relevant information from a complicated perceptual field)
 - Type A personality (extrovert, aggressive, time conscious, competitive) are more likely to have accidents due to their impulsiveness.
 - However, introverts can also be vulnerable to accidents as they are unlikely to ask for help or advice.
- Human Error- Riggio (1990) identified 4 types of error that can lead to accidents:
 - Errors of omission- failing to carry out a task
 - Errors of commission- making an incorrect action
 - Timing errors- working too quickly/slowly
 - Sequencing errors- doing things in the wrong order
- Illusion of invulnerability-
 - The sinking of the Titanic in 1912 could be blamed on the captain of the ship. The argument is that he had an illusion of vulnerability.
 - This term actually refers to something linked to 'groupthink'. This is when a mode of thinking becomes so dominant in a group that realistic (and better) alternatives are overlooked, especially under stressful conditions. The members of the group believe they are immune to accidents.
 - So the captain was sailing an 'unsinkable ship' too fast at night when it was known icebergs were in the area.
- Cognitive overload-
 - Is the term given to a situation when a person cannot cope with all the competing mental demands placed on them.
 - The study of selective attention highlights some limitations on our abilities to process info.

- One example is reported by Baber (1988) in a description of an aircraft accident in the area of Zagreb, Yugoslavia. Two aircrafts collided resulting in the death of 176 people. One of the factors identified as leading to the collision was the cognitive overload of the air traffic controller responsible for the sector the planes were flying in.
- At the time of the accident the controller's assistant was missing; there were eleven aircrafts in his sector; he was in simultaneous radio communication with four other aircraft, and he was taking part in a telephone conversation with Belgrade concerning two further aircraft. The controller had received very short notice of the arrival of one of the accident aircrafts into his sector and it appears that the short notice and the overload of information contributed to the final error.
- Nevertheless, he was prosecuted and jailed for 7 years. This is a graphic illustration of the limitations of our information processing capacities, and shows that the public response to disasters is often to blame individuals, when it is the systems within which the individuals are working which are actually at fault. However, he was released after 2 years because it was agreed that the unmanageable system was to blame.
- Other reasons why people have accidents-
 - A 'transient state' is where a person is not well so less physically and mentally active. Pheasant
 - Tired and fall asleep- especially at late night driving
 - Shiftwork- most errors during an 8 pm to 6am shift
 - People make substitution errors- when one instrument is confused with another
 - People have motion stereotypes in which behaviours are done 'automatically' and logically rather than adapting to the needs of a rapidly changing situation.
- Reducing accidents and promoting safety behaviour
 - Safety behaviour is maintaining a healthy existence through safe practices at work and in the home.
 - Token Economy

- To reduce accidents at work, Fox et al (1987) studied the use of a token economy system at an open-cast mine.
- Employees could earn tokens to gain rewards for working without time lost for injury; not being involved in accidental damage to equipment; and behaviour that prevented accidents or injuries.
- Tokens were lost for unsafe behaviour that could cause accidents.
- Result- there was a dramatic decrease in days lost through injury and the number of accidents reduced. These improvements were maintained over a number of years.
- Reorganising shift work- The best option is to move towards a slow rotation of shifts rather than a quick rotation of shifts so that the workers' circadian rhythms have a chance to alter to the new shift pattern.

- Safety promotion campaign
 - The trend data from Fire Statistics, UK suggests that chip and fat pan fires are the biggest cause of accidental non-fatal casualties in dwelling fires. (oil overheats and ignites)
 - Major issue as biggest cause of death by fire; billions of pounds of property damage; many go unreported; huge costs to emergency services.
 - Two approaches- prevention and containment
 - Cowpe (1989) reports on a television advertising campaign that showed viewers how to deal safely with a chip pan fire (providing information) and featuring a chip pan fire victim (fear arousal) who told her tragic story.
 - The campaign was successful but recommended an annual follow-up.