



THEORIES OF ACCIDENT CAUSATION




Reference: Occupational Safety and
Health, 5th ed.

Presented by:

Alma Maria Jennifer Gutierrez



WHY DO ACCIDENTS HAPPEN?

-  **This question has concerned safety and health decision makers for decades.**
-  **Over the years, several theories of accident causation have evolved that attempt to explain why accidents occur.**
-  **Models based on these theories are used to predict and prevent accidents.**

MOST WIDELY USED THEORIES OF ACCIDENT CAUSATION

- ❖ **Domino Theory**
- ❖ **Human Factors Theory**
- ❖ **Accident/Incident Theory**
- ❖ **Epidemiological Theory**
- ❖ **System Theory**
- ❖ **Combination Theory**
- ❖ **Behavioral Theory**

DOMINO THEORY



- * **Herbert W. Heinrich, an early pioneer of accident prevention and industrial safety.**
- * **He studied 75,000 industrial accidents.**
 - ⊗ **88% of Industrial Accidents are caused by unsafe acts committed by fellow workers.**
 - ⊗ **10% of industrial accidents are caused by unsafe conditions.**
 - ⊗ **2% of industrial accidents are unavoidable.**

HEINRICH' AXIOMS OF INDUSTRIAL SAFETY

1. Injuries result from a completed series of factors, one of which is the accident itself.
2. An accident can occur only as the result of an unsafe act by a person and/or a physical or mechanical hazard.
3. Most accidents are the result of unsafe behavior by people.
4. An unsafe act by a person or an unsafe condition does not always immediately result in an accident/injury.

HEINRICH' AXIOMS OF INDUSTRIAL SAFETY

1. The reasons why people commit unsafe acts can serve as helpful guides in selecting corrective actions.
2. The severity of an accident is largely fortuitous, and the accident that caused it is largely preventable.
3. The best accident prevention techniques are analogous with the best quality and productivity techniques.

HEINRICH' AXIOMS OF INDUSTRIAL SAFETY

1. **Management should assume responsibility for safety because it is in the best position to get results.**
2. **The supervisor is the key person in the prevention of industrial accidents.**
3. **In addition to the direct costs of an accident, there are also hidden or indirect costs.**

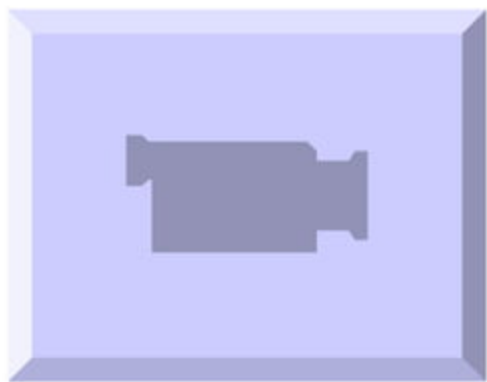


5 FACTORS IN THE SEQUENCE OF EVENTS LEADING TO ACCIDENTS

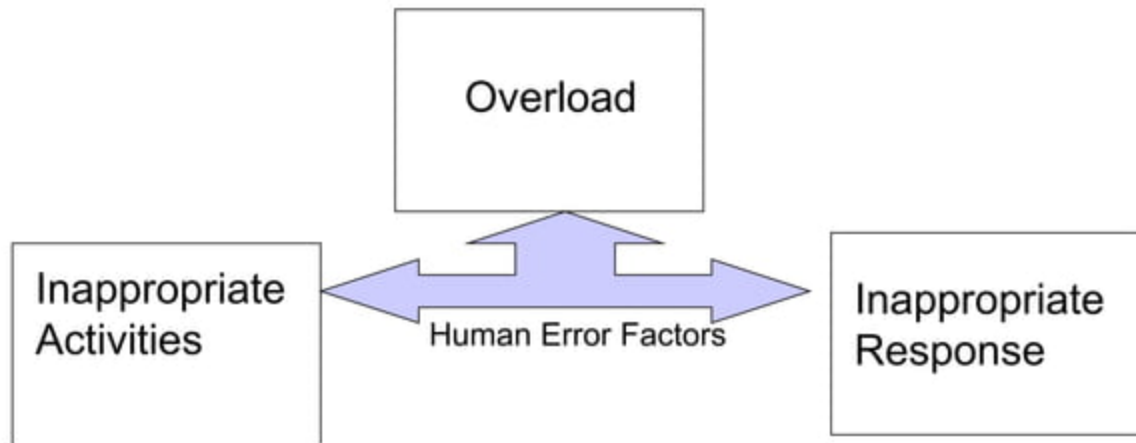
- 1. Ancestry and social environment**
- 2. Fault of person**
- 3. Unsafe act/mechanical or physical hazard.**
- 4. Accident**
- 5. Injury**



- Posh Video



HUMAN FACTORS THEORY



HUMAN FACTORS THEORY

Human Factors Theory

Overload

- ❑ Environmental Factors
- ❑ Internal Factors
- ❑ Situational Factors

Inappropriate Response

- ❑ Detecting a hazard but not correcting it
- ❑ Removing safeguards from Machines and equipment
- ❑ Ignoring Safety

Inappropriate Activities

- ❑ Performing tasks without the requisite training
- ❑ Misjudging the degree of risk involved with a given task



ACCIDENT/INCIDENT THEORY

- ≈ **Extension of the human factors theory**
- ≈ **Developed by Dan Petersen**
- ≈ **Introduced such new elements as ergonomic traps, the decision to err and systems failure**
- ≈ **In this model, overload, ergonomic traps and decision to err lead to human error.**
- ≈ **The system failure is an important contribution of Petersen's theory.**

SOME WAYS THAT SYSTEMS FAIL - PETERSEN

- ❧ Management does not establish a comprehensive safety policy.
- ❧ Responsibility and authority with regard to safety are not clearly defined.
- ❧ Safety procedures such as measurement, inspection, correction and investigation are ignored or given insufficient attention.
- ❧ Employees do not receive proper orientation.
- ❧ Employees are not given sufficient safety training.

Petersen's Accident/Incident Theory

Overload

- ❖ Pressure
- ❖ Fatigue
- ❖ Motivation
- ❖ Drugs
- ❖ Alcohol
- ❖ Worry

Ergonomic Traps

- ❖ Incompatible workstation
- ❖ Incompatible expectations

Decision to Err

- ❖ Misjudgment of the risk
- ❖ Unconscious desire to err
- ❖ Logical decision based on the situation

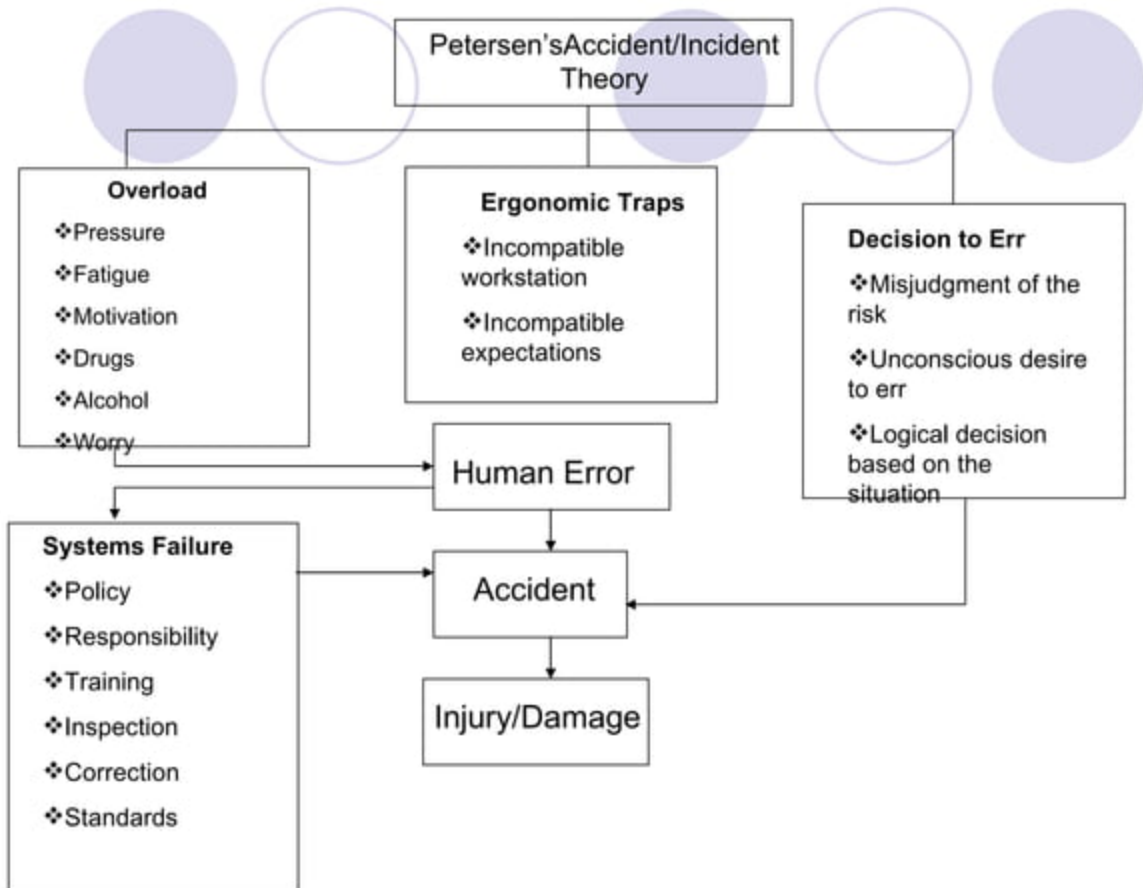
Human Error

Accident

Injury/Damage

Systems Failure

- ❖ Policy
- ❖ Responsibility
- ❖ Training
- ❖ Inspection
- ❖ Correction
- ❖ Standards



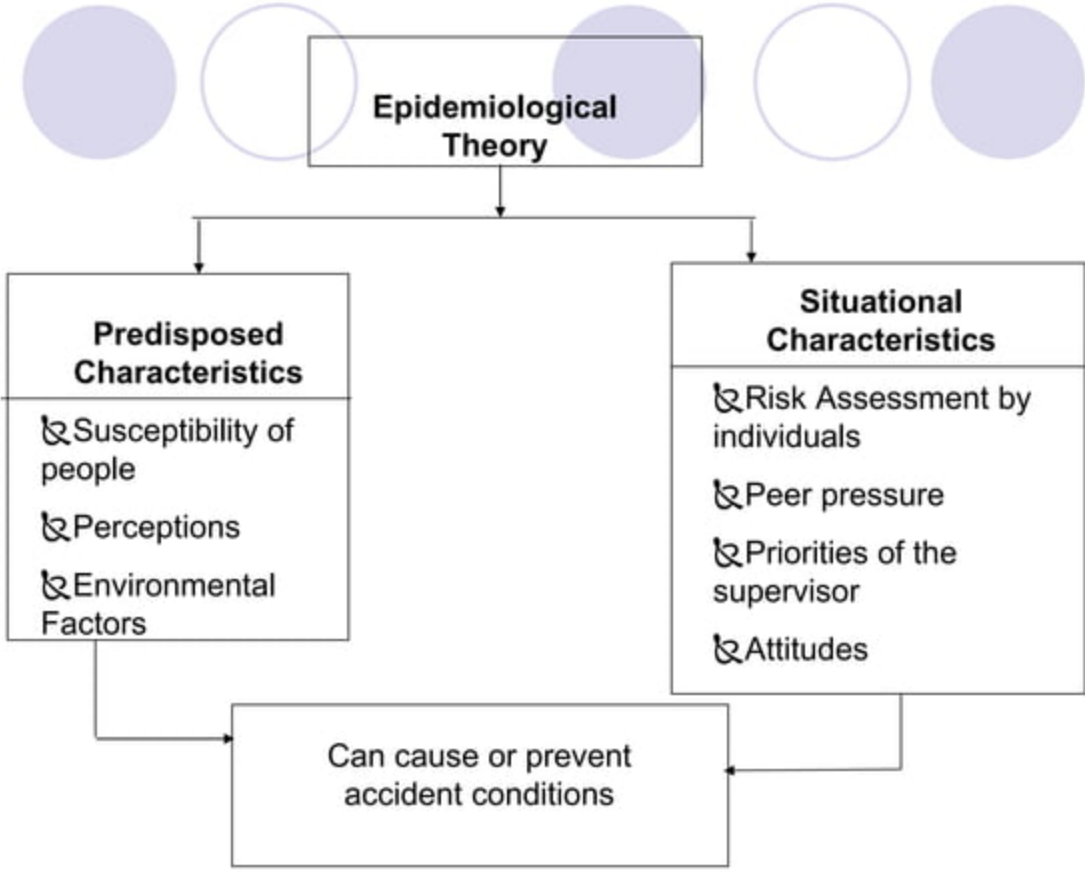
Carpal Tunnel Syndrome in Poultry Industry





EPIDEMIOLOGICAL THEORY

- ② **Epidemiology is the study of causal relationships between environment factors and disease.**
- ② **This model can also be used to study causal relationships between environmental factors and accidents or diseases.**



The diagram illustrates the Epidemiological Theory of accidents. At the top, a box labeled 'Epidemiological Theory' is flanked by four circles: two solid purple and two hollow purple. An arrow points down from this box to a horizontal line, which then branches into two arrows pointing to two separate boxes: 'Predisposed Characteristics' on the left and 'Situational Characteristics' on the right. The 'Predisposed Characteristics' box contains a list of factors: 'Susceptibility of people', 'Perceptions', and 'Environmental Factors'. The 'Situational Characteristics' box contains a list of factors: 'Risk Assessment by individuals', 'Peer pressure', 'Priorities of the supervisor', and 'Attitudes'. Arrows from the bottom of both boxes point to a final box at the bottom labeled 'Can cause or prevent accident conditions'.

Epidemiological Theory

Predisposed Characteristics

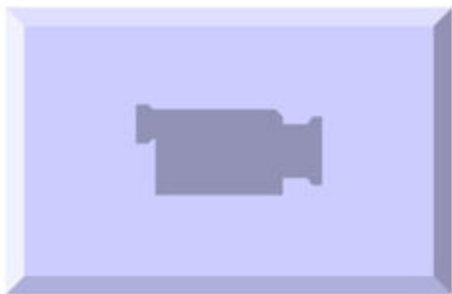
- ☒ Susceptibility of people
- ☒ Perceptions
- ☒ Environmental Factors

Situational Characteristics

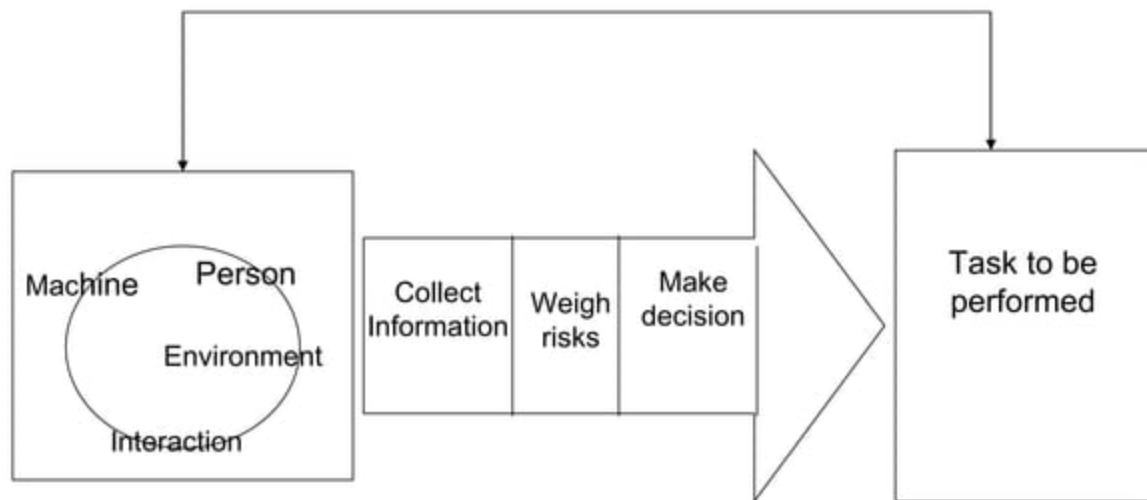
- ☒ Risk Assessment by individuals
- ☒ Peer pressure
- ☒ Priorities of the supervisor
- ☒ Attitudes

Can cause or prevent
accident conditions

Ergonomia Video



SYSTEMS THEORY





5 FACTORS TO CONSIDER

- * Job requirements**
- * The workers' abilities and limitations**
- * The gain if the task is successfully accomplished.**
- * The loss if the task is attempted but fails**
- * The loss if the task is not attempted.**



COMBINATION THEORY

- There is often a degree of difference between any theory of accident causation and reality.
- The actual cause may combine parts of several different models.



BEHAVIORAL THEORY

- Often referred to as behavior based safety (BBS).
- The most prominent proponent is E. Scott Geller, a senior partner of Safety Performance Solutions, Inc. and a professor of psychology.







7 PRINCIPLES - GELLER

1. Intervention
2. Identification of external factors
3. Motivation to behave in the desired manner
4. Focus on the positive consequences of appropriate behavior
5. Application of the scientific method
6. Integration of information
7. Planned interventions



DRUGS AND ALCOHOL

-  **Drugs and alcohol are the root contributing cause of many workplace accidents every year.**
-  **Approximately 77% of drug users are employed**
-  **More than a third of all workers between 18-25 are binge drinkers**
-  **Alcoholism alone causes 500 M lost days annually.**

DEPRESSION AND ACCIDENT CAUSATION

- **Clinical depression is an invisible problem in the workplace.**
- **It can be a major cause of accidents.**
- **One in 20 people suffer from clinical depression which is the root cause of more than 200 M lost workdays annually.**

WARNING SIGNS OF CLINICAL DEPRESSION

- ⌘ **Persistent dreary moods (sadness, anxiety, nervousness)**
- ⌘ **Signs of too little sleep**
- ⌘ **Sleeping on the job or persistent drowsiness.**
- ⌘ **Sudden weight loss or gain**
- ⌘ **General loss of interest**
- ⌘ **Restlessness, inability to concentrate or irritability**
- ⌘ **Chronic physical problems (headaches, digestive disorders, etc.)**
- ⌘ **Forgetfulness or an inability to make simple decisions**
- ⌘ **Persistent feeling of guilt**
- ⌘ **Feelings of low self-worth**
- ⌘ **Focus on death or talk of suicide**



MANAGEMENT FAILURES AND ACCIDENT CAUSATION

- **Failure to ensure a safe and healthy work environment.**
- **Supervisors play a critical role in making sure that employees work in a safe and healthy environment.**

ROLE OF SUPERVISOR IN WORKPLACE SAFETY AND HEALTH

- ✧ **Orienting new employees to the safe way to do their jobs**
- ✧ **Ensuring that new and experienced employees receive the safety and health training they need on a continual basis.**
- ✧ **Monitoring employee performance and enforcing safety rules and regulations.**
- ✧ **Assisting safety and health professionals in developing accident reports.**
- ✧ **Keeping up to date on safety issues**
- ✧ **Setting a positive example for employees to say “ the safe way is the right way”**