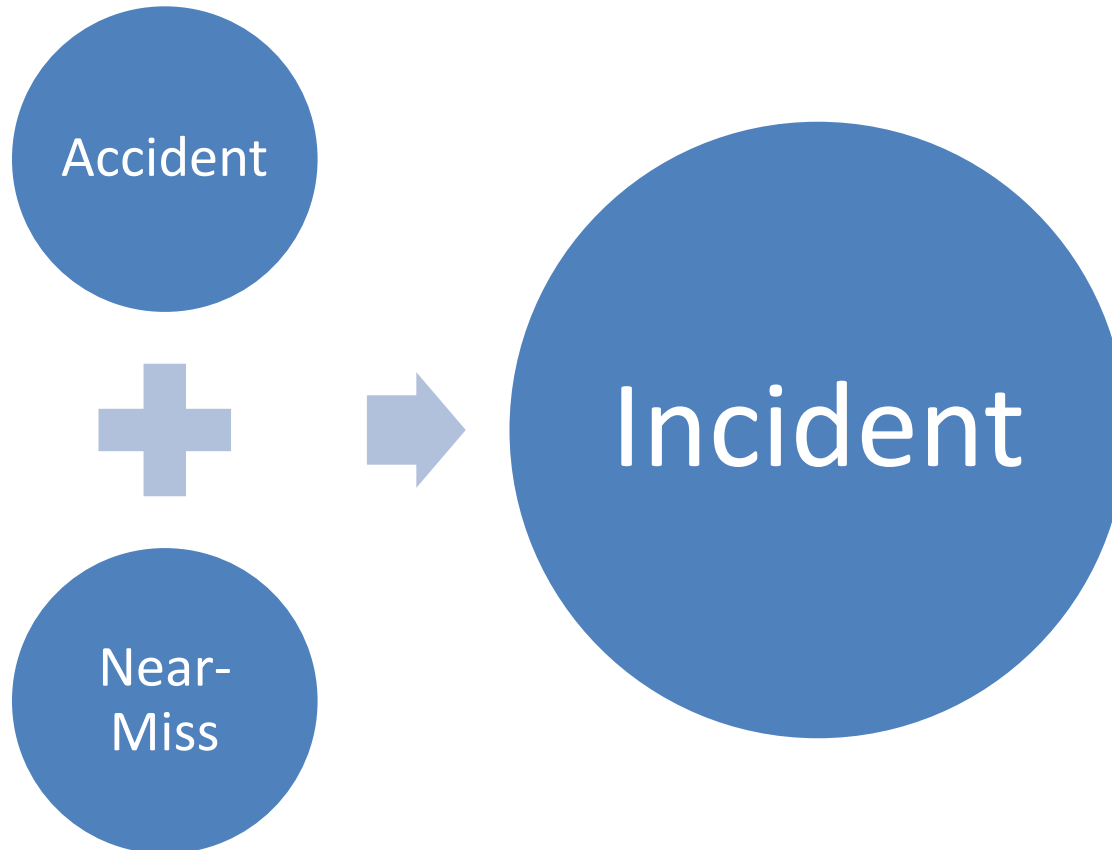


Safety and Human Error

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Accidents



Accidents may occur due to

- 1. Unsafe condition
- 2. Unsafe act

The Facts

- It should be understood by all operation personnel that 96% of all accidents are related to unsafe behaviours and that only 4% of accidents are caused by unsafe conditions.

Type of human error

- **Mistake** – an error that occurs as a result of ignorance of the correct task or the correct way to perform it.
- **Mismatch** – an error that occurs because the task is beyond the physical or mental ability of the person asked to perform it, perhaps beyond anyone's ability.

Type of human error

- **Non-compliance or violation** – an error that occurs because someone decides not to carry out a task or not to carry it out in the way instructed or expected.
- **Slips and lapses** – an error that occurs as a result of forgetfulness, habit, fatigue or similar psychological causes.

Table 3.6: System and human failure modes

	System failure mode	Human failure mode
Timing (time of onset)	A position/location is reached too early or too late. Equipment not activating as required	An action is started too early or too late
Duration (time of cessation)	A function is performed too briefly or for too long. System state held too briefly or for too long	An action is performed too briefly or for too long
Distance / length	System or object transported too short or too far. An object is too short or too long	An object or control device is moved too short or too far
Speed	System moving too slowly or too fast. Equipment not responding as required	An action performed too slowly or too fast
Direction	System or object (mass) moving in the wrong direction	An action or movement is in the wrong direction
Force / power / pressure	System/component exerting too little or too much force, or having too little or too much pressure or power. Equipment not calibrated correctly	An action is performed with too little or too much force
Magnitude	The extent or amplitude of a movement is too large or too small	The extent or amplitude of an action or a movement is too large or too small
Object	Function targeted at wrong object	An action is performed on wrong object or target
Sequence	Two or more functions performed in the wrong order	Two or more actions are performed in the wrong order
Quantity and volume	System/object contains too little or too much, is too light or too heavy	None

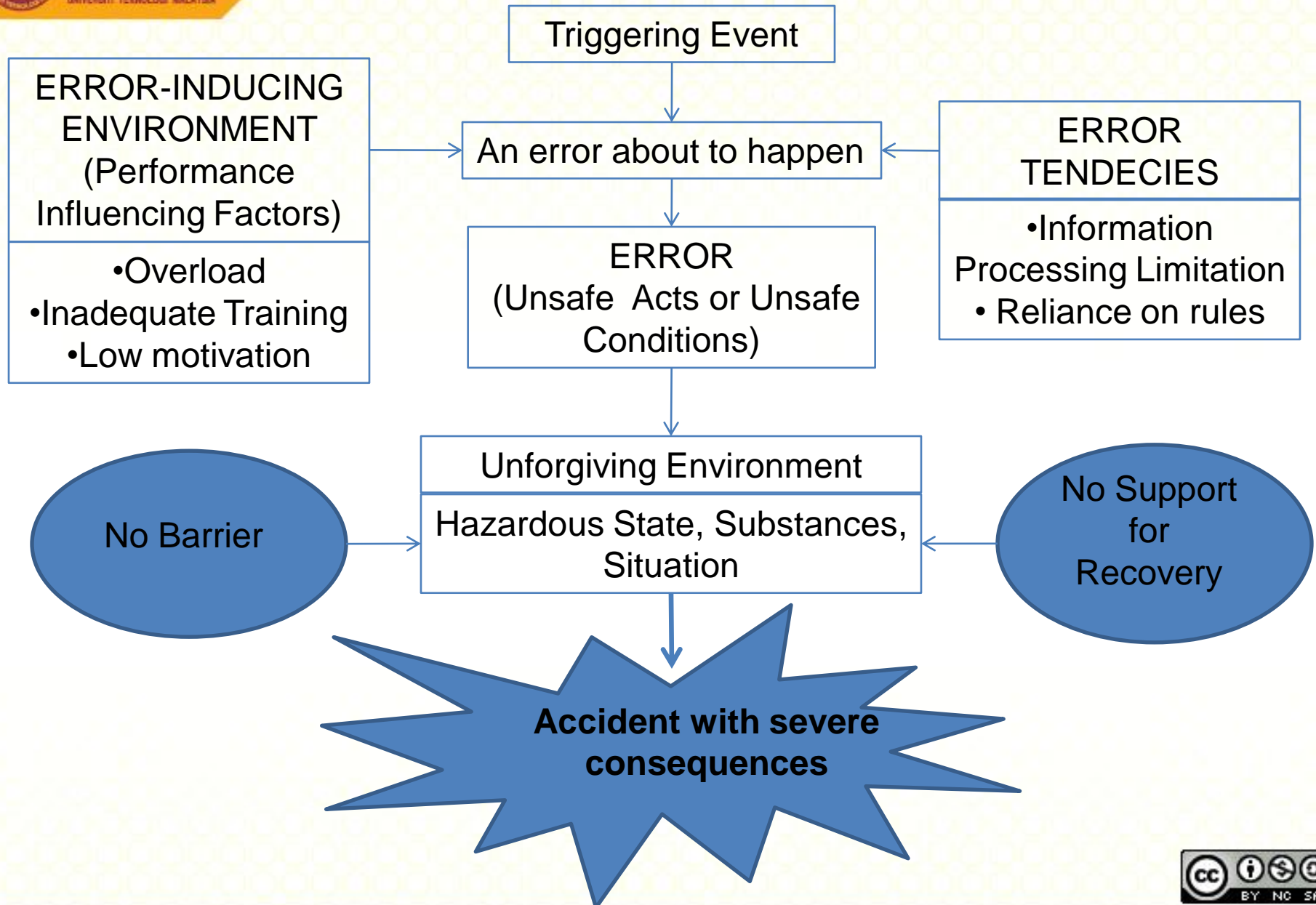
Causal Factors for Accidents

Human Performance:

- Verbal communication
- Written procedures & documents
- Man-machine interface
- Environmental condition
- Work schedule
- Work practices
- Work organization/planning
- Supervisory methods
- Training/qualification
- Change management
- Resource management
- Managerial method

Equipment:

- Design configuration & analysis
- Equipment condition
- Environmental condition
- Equipment specification, manufacture & construction
- Maintenance/testing
- Plant/system operation



References

- Bill Luther, *Oil Field Safety – Texas Oil and Gas*, 2010.
- Reason J., *Human Error*, Cambridge Press, 1999.