

# Taxonomy of Human Errors

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# Why Do We Need This

- ▶ We need usable error types to troubleshoot
- ▶ Different error types may have different solutions
- ▶ Imagine debugging with no error codes, no debug symbols and no ability to alter the code

# Kinds of Errors

**Planning** errors involve conceptual mistakesm intending to do the wrong thing  
**Execution** errors involve meaning to do one thing and doing another

# Pkanning Error Causes

## Conceptual Errors

- ▶ Loss of Situational Awareness
- ▶ Inadequate Systems Understanding
- ▶ Inadequate review

## Poor judgment

- ▶ Fatigue
- ▶ Inadequate standard operating procedures
- ▶ Hazardous Attitudes (usually organizational)

# Fixing Loss of Situational Awareness

- ▶ Look at where the deductive process goes wrong
- ▶ Revisit monitoring systems and dashboards
- ▶ Revisit processes and coordination points. Encourage sharing updates before doing anything significant.

# Hazardous Attitudes

- ▶ Anti-authority
- ▶ Impulsivity
- ▶ Invulnerability
- ▶ Macho
- ▶ Resignation

In post mortem analysis we should presume attitudes are organizational

# Remedies for Hazardous Attitudes

- ▶ Calling out attitudes as they come up in post mortem analysis
- ▶ Link such attitudes to incidents
- ▶ Revisit standard operating procedures after such incidents

# Execution Errors

**Slips** are erroneous performance, for example typing a command incorrectly

**Lapses** are erroneous memory, usually forgetting to do a step

Many causes of execution errors manifest as both and have particular signatures.



# Stress-related Fixation

- ▶ Narrowing of focus and awareness under stress
- ▶ Obsession with details, which could be irrelevant
- ▶ Missing other details
- ▶ Leads to planning errors

# Stress-related Reversion

- ▶ Under stress we revert to what we know
- ▶ Commands may be typed in their usual forms
- ▶ Leads to execution errors

# Fixing Stress-Related Issues

- ▶ Stress management training for operators
- ▶ Review of causes of stress in the workplace

# Fatigue-related Errors

- ▶ Planning errors due to poor judgement
- ▶ Execution errors, mostly due to lapses and erroneous memory
- ▶ Execution error rates increase over time

# Remedies for Fatigue

- ▶ Rest periods after on call
- ▶ Don't mix on call with normal work if there are after-hours work
- ▶ Rest periods
- ▶ Introduce automation to reduce repetition
- ▶ Break up repetition into smaller chunks

# Social Power Distance Problems

- ▶ Lack of intervention
- ▶ Large power differential
- ▶ Made worse by a lack of strategies for intervention upwards

# Fixing Power Distance Issues

- ▶ Separate status updates from operational work
- ▶ Reduce power distance
- ▶ Come up with strategies of intervention upward
- ▶ Focus on a trustful working relationship where interventions are appreciated

# Exercise (individual)

## Instructions

1. Look at one incident from your career where human error was a factor
2. Dive into the factors that enabled these errors. Was it stress? Fatigue?
3. Write up an quick outline of what lead to these factors (stressors, fatigue factors etc)
4. Suggest a couple organizational or environmental improvements to reduce these.



## Exercise (group)

1. Take your exercise material from the last exercise
2. Share the results with your partner.
3. Have your partner ask further questions to help clarify the situation
4. For those in a zoom call, have some people volunteer and go through these on the call.