Session 5

MEASUREMENT TOOLS FOR MANAGEMENT

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"award for no-lost time accident"

"fines for anyone who breaks the rules"

No one single and simple approach to deal with workplace hazards

AWARD FOR NO-LOST TIME ACCIDENT

- Reconsider Accident like “First aid”, “Medical incident” or “Transfer to Another Job” that will not fall into Lost Time Accident
- Simple awards to every little accomplishment by a Department
  - 300,000 or 500,000 No-Lost Time Accident instead of 1M
  - Start small or simple acknowledgment to the group
- Imbed into the system of the employee such as KPI (Key Performance Indicator) as to the target of No-Lost Time Accident

FINES FOR ANYONE WHO BREAKS THE RULES

- Thorough investigation will be made if ever the Lost Time Accident happens (up to the Level of the Manager)
- It will not only be the responsibility of the employee but also the whole group or Department. Involve the one breaking the rules:
  - Worker
  - Immediate Supervisor
  - Department Manager

FINES FOR ANYONE WHO BREAKS THE RULES

- Breaking the Rule on Safety such as:
  - Making shortcuts on company Policies or Rules and Regulations
  - Violating the Regulatory Requirements
  - Direct order from poor Supervision prioritizing Operational Targets and compromising Safety of the Workers
  - Removing Safety Devices such as removing machine guards, using defective alarms, overloading gauges, etc…

FINES FOR ANYONE WHO BREAKS THE RULES

- Breaking the Rule on Safety such as:
  - Working on PPE (Personal Protective Equipment) related violations
    - No orientation on how to use a PPE
    - Using personal PPE (not undergoing quality test from the Safety Department)
    - Defective PPE offers no protection
    - Mishandled or abused use of a PPE
    - Not wearing the quality approved issued PPE

Approaches

Analytical

- deals with hazards by studying their mechanisms, analyzing statistical histories; computing probabilities of accidents, conducting toxicological studies, and weighing costs and benefits of hazards elimination

ANALYTICAL

- Is there a chance of mechanical failure on the machine?
- Is there a chance that a body part be caught (hair, working clothes, jewelries, etc…) on the machine?
- On the history of accidents consider the following:
  - Age
  - Sex
  - Body Part
  - Training History of the victim (new hired / complacency)

ANALYTICAL

- How often a person interact with the machines or equipment?
- SDS (Safety Data Sheet) hazards involve on the chemical used.
- Is there a history of failure on type of chemical used?
- What are the necessary controls on these hazards that costs the company less by not sacrificing Safety?
  - Engineering
  - Administration
  - PPE (Personal Protective Equipment)

Approaches

Accident / Incident Analysis

- form of review of mishap to determine the safety performance of a company

Incidence Rates

- includes all injuries or illnesses that require medical treatment, plus fatalities

ACCIDENT / INCIDENT ANALYSIS

- Summarize those accidents/incidents that resulted to a “Loss Time Accident”
- Analyze these accidents on how it had happened:
  - Worker (Trained? Complacent? New Hired? Low Morale?)
  - Equipment / Machine (No Preventive Maintenance? Over Loaded? Sub standard Replacement?)
  - Procedure (No Written Procedure? Making Short cuts?)
  - Environment (Poor Lighting? Extreme Temperature? Poor Housekeeping?)

INCIDENCE RATE

- Accident happens that resulted to an absence of an employee in more than a day.
- It covers those who are injured and become ill due to work related accidents or illness including fatality.
- Injure or become ill due to the following:
  - Incur an accident due to making shortcuts, un-supervised, no orientation, not using proper PPE, etc…
  - Become ill due to superseding the environmental limits of industrial hygiene (Threshold Limits, Ceiling and Average)

Approaches

Computation:

$$\text{Total injury/illness incidence rate} = \frac{\text{No. of injuries / illnesses / fatalities x 200,000}}{\text{Total hrs. worked by all workers for the period covered}} \quad (2.1)$$

- Total injury / illness incidence rate represents the number of injuries expected by a hundred employee firm in a full year
- A typical data collection period is one year

Approaches

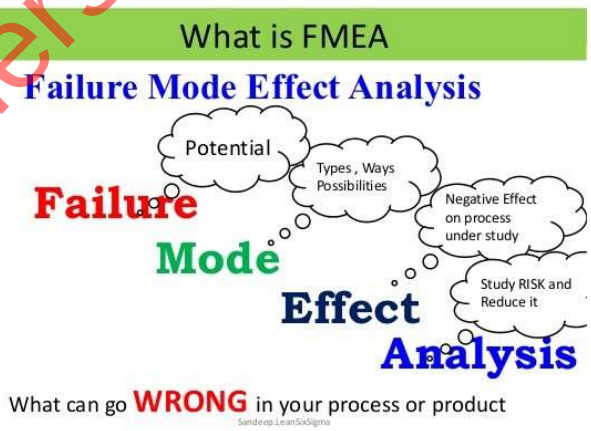
incidence rate - a general term in addition to the total injury/ illness, incidence rate includes the following:

- Injury incidence rate
- Illness incidence rate
- Fatality incidence rate
- Lost-workday-cases incidence rate (LWDI)
- Number-of -lost-workdays rate
- Specific-hazard incidence rate

Approaches

Failure Modes and Effects Analysis (FMEA)

- trace the effects of individual component failures on the overall or "catastrophic" failure of equipment
- equipment -oriented instead of hazard-oriented
- can determine what causes a particular equipment to fail in use



Fault-tree Analysis

concentrates on the end result, which is usually on accident or some other adverse consequence

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term arises from the appearance of the logic diagram that is used to analyze the probabilities associated with the various causes and their effects

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leaves and branches are the myriad individual circumstances or events that can contribute to an accident

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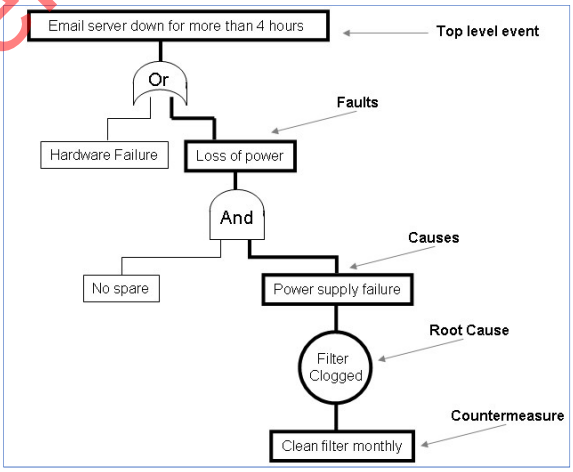
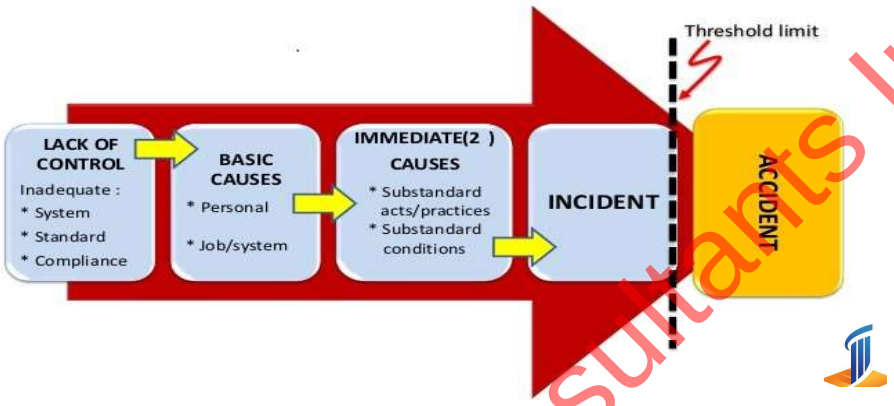
base or trunk of the tree is the catastrophic accident or other undesirable result being studied

Fault-tree Analysis



Approaches

Accident Causation Model (1974)



Loss Incident Causation Models

model that emphasizes the cause of "loss incidents“

the entire causal system is examined, including the primary "proximal" causes, and secondary "distal" causes

- proximal - direct hazard, i.e. missing guard on a punch press
- distal - include management attitude or policy that is deficient in allocating resources for the elimination of hazards

LOSS INCIDENT CAUSATION MODELS

- ORGANIZATION FAILURES
  - Top Management commitment through Policies and Procedures
  - Hiring of right and competent workers
  - Deploying of trained and on the right time workers
  - Availability and issuance of approved PPE (personal protective equipment)
  - Fines and penalties for violators (Top to Bottom implementation)

LOSS INCIDENT CAUSATION MODELS

- UNSAFE SUPERVISION
  - Deployment of untrained Supervisor
  - Prioritizing operational goals than Safety Performance
  - Disregarding proper procedures and company policies (over time works, deploying untrained employees)
  - Exposing employees to hazards without the use of PPE (personal protective equipment) – damaged, defective, sub-standard

LOSS INCIDENT CAUSATION MODELS

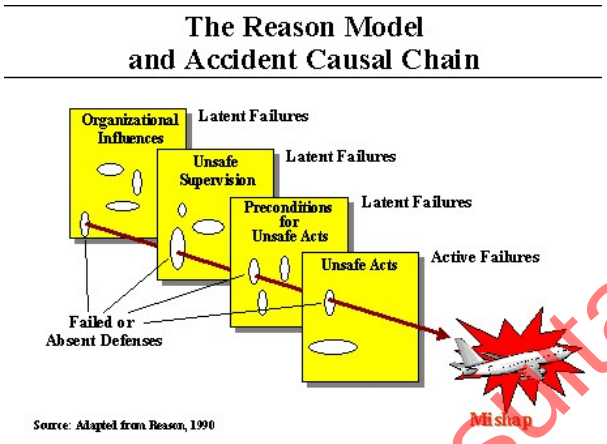
- PRECONDITIONS FOR UNSAFE ACTS
  - Being complacent with his work (been doing the wrong work without right supervision, written procedure, right PPE)
  - Poor Management support (below minimum salary, over time rates, trainings)
  - No coordination between the Management and the workers (toolbox meetings, reporting system, safety and health committee)

LOSS INCIDENT CAUSATION MODELS

- UNSAFE ACTS
  - Worker doesn't know the Safe Work Procedure (deliberately doing the wrong procedure)
  - Worker under time pressure to finish work (due to poor Supervision Time deliverables, Family problems)
  - Due to new equipment/machines (without trainings conducted, orientation to new operation)
  - Management support (missing Engineering, Administrative or PPE control)

Loss Incident Causation Models

model that emphasizes the cause of "loss incidents“



4 Metrics Every Safety Scorecard Needs

“There is no perfect measure common to all organizations. But for many, a company’s safety scorecard begins and ends with recordable rate.”

Recordable data - AEDR

AEDR - DOLE/BWC/HSD-IP-6b

- Disabling Injury/Illness Frequency Rate

Frequency Rate (FR) = No. of disabling injury/illness x 1,000,000 / Employee-hours of exposure*

**total number of employee hours worked by all employees*

CATEGORY IV

Exposure Metrics

Each organization should aim for a set of measures that provide useful and robust indicators of how it is doing against its objectives. One way to do that is to track "leading indicators."

Leading indicators are things that provide a sign of what is likely to occur in the future.

Exposure metrics measure risks and changes to those risks. The higher the exposure, the greater the likelihood there is of an incident.

Some examples

NUMBER OF SAFE WORK PERMIT JOBS

This is keeping track of the number of tasks for which safe work permits are required during the month. Jobs requiring safe work permits are, by definition, higher risk. Therefore, an increase in the number of these jobs is indicative of a higher exposure profile.

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PROCESS EXCURSIONS/UPSETS

We define this as the number of times during the month that any process has a parameter that falls outside the "not to exceed" limits for the process. Even when exceeded limits are managed without adverse outcome, their occurrence is indicative of exposure increase.

HOUSEKEEPING

Housekeeping issues might include trash pileup, pallets stored in walkways, or tools left out. "How free is my workplace of those hazards?"

Measure the physical conditions and more importantly your response to those conditions.

PERCENT SAFE BEHAVIORS

This is the percentage of observed behaviors completed safely, provided that the observation process is specifically designed and implemented to produce "measurement quality" behavioral data.

WORKER HOURS

When you look at the shifts and overtime hours of your workers, is it possible that fatigue is contributing to more incidents?

CATEGORY 2:

Control Metrics

Another kind of leading indicator is a control metric.

Control metrics provide data to help managers assure that intended activities are being done. They help measure the effectiveness of exposure mitigation.

Some examples

INSPECTIONS PLANNED VS. COMPLETED

This measure tracks the number of inspections, including safety committee and supervisory walk-arounds, completed compared to the number planned. The figure is reported as a number versus plan and as percentage of plan completed.

LEADERSHIP AUDITS

What is the number of field audits, inspections, and walk-arounds completed by a location's senior leadership team members per team member during the quarter?

MECHANICAL INTEGRITY TESTING % PAST DUE

This measure shows the percent (%) of scheduled mechanical integrity tests overdue for key equipment.

The extent to which you're doing fix-it maintenance versus preventive maintenance is a good way to know if you've got problems in your process.

CATEGORY 3:

Lagging Indicators

Lagging indicators quantify what has already happened.

While helpful in some ways, lagging indicator numbers are too often misjudged.

"Lagging indicators provide information on whether I'm getting better or worse in my performance."

The measurements are helpful but the information they give you is **not** the intervention. They're **not** the change agent.

CATEGORY 4:

Precursor Events

Precursor events sit between leading and lagging indicators. They reflect things that have already happened but reveal the potential for future incidents with more severe outcomes.

An example of a precursor event would be a plane blowing out a tire on landing but still safely pulling up to its gate on time.

- precursor events are typically associated with serious injuries and fatalities (SIF).
- indicative of a broader safety issue
- believing that SIFs are fluke occurrences is flawed thinking

If SIFs truly were fluke occurrences, then there would be little chance of preventing them.

- The **definition** of a **fluke** is an odd **occurrence** that happens and is unlikely to be repeated. An example of a **fluke** is a snowstorm in July.

- It is important to track the potential for fatalities and serious injuries separately from incidents with less-serious potential.
- Managers who understand the potential for fatality and serious injury can make conscious decisions about targeting and prioritizing safety efforts.

- Use targeted mechanisms to identify and address precursors.
- Most precursors can be identified through a system that combines effective observation with focused discussion and interviewing in the workplace.
- Implementation of this process should occur within a change management framework.

FINAL NOTE

There is no perfect suite of measures common to all organizations. Each organization should develop its own set of leading indicators and precursors of serious injuries.