

INDUSTRIAL SAFETY AND RISK ASSESSMENT WORKSHOP

PART 1: RISK QUALITY ASSESSMENT

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Risk Engineer

Overview

- Risk Assessment
 - Definition
 - Risk quality factors
- Risk Survey Program
 - Purpose
 - Site Visit Preparation & Procedures
 - Site Observations & Inquiries
- Plant Inspection



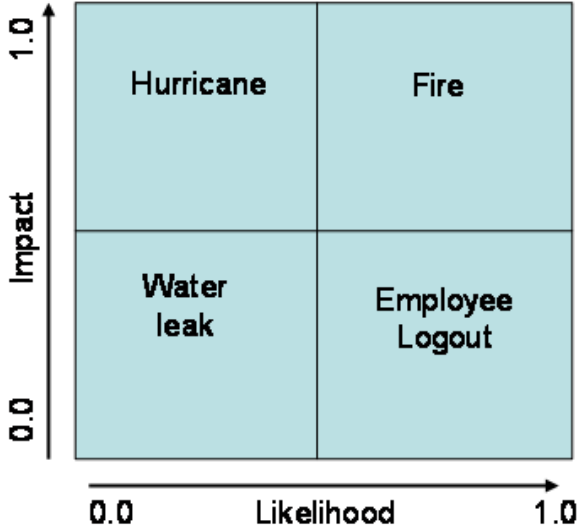
Risk Assessment - Definition

Risk assessment is the process of identifying variables that have the potential to negatively impact an organization's ability to conduct business.

Risk assessments can be:

- **Quantitative** [assign numerical values, probability / impact, calculate risk factors]
- **Qualitative** [No numerical values, simply to rank which risks pose the most danger.]

Event	Likelihood (a)	Impact (b)	Risk factor (a x b)
Fire in data centre	0.7	0.9	0.63
Loss of power	0.5	0.8	0.40
Staff illness	0.6	0.5	0.30
Hurricane	0.4	0.9	0.36
Water leak	0.3	0.5	0.15
Employee forgot to log off from workstation	0.8	0.3	0.24



Property Loss Control – Terminologies

Hazard

“a chemical or physical condition of a system that has the potential for causing damage to people, property, the environment or some combination of these.”

Hazard Types

Building Services Hazards

- Natural Gas Supply for Heating
- Electrical Equipment
- Boilers
- Refrigeration System

Operations & Process Hazards

- Chemical Processes
- Flammable Liquid Storage & Use
- Natural Gas Supply for Process Furnaces

Hazard Analysis

Systematic analysis of all hazards and focuses on mechanisms

The risk quality factors

- Inherent risks – e.g. process conditions
- Location risks – e.g. windstorm, earthquake, flood, political
- Hardware – i.e. equipment design and construction
- Software – i.e. management systems
- Emergency control

Top ten areas of concern in rating risks

1. Inspection
2. Process Safety
3. Operations - including Manning, Training, Systems, Procedures
4. Maintenance
5. Process Area Layout
6. HSE Standards & Compliances
7. Site Layout
8. ERP
9. Business Continuity Plan
10. Fire Detection & Alarm

Risk Survey Program



Risk Survey - Objectives

- Review site conditions
- Provide updated Underwriting information
- Provide the Client with “Risk Improvement” recommendations
- Evaluate the Client’s ‘loss prevention and control program’
- Confirm the readiness of the protection systems and programs
- Review outstanding recommendations

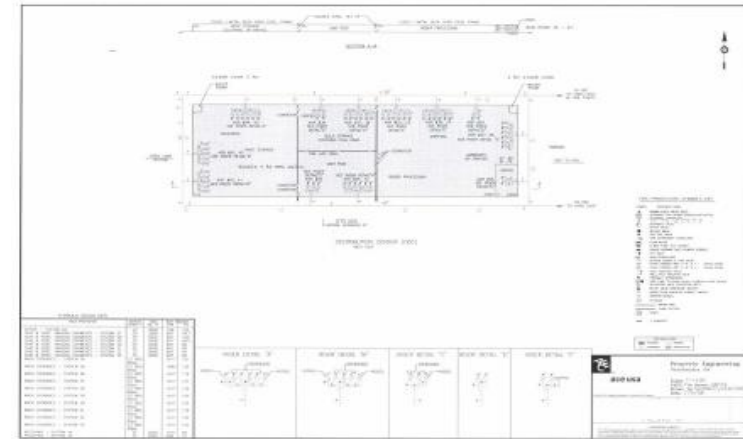
Methods of Reporting Underwriting Information – C.O.P.E

- **C**onstruction
- **O**ccupancy & Operations
- **P**rotection – both physical & procedural
- **E**xposures & Hazards

C. O. P. E.

Preparation for Site Visit

- Review previous risk reports
- Site Diagrams
- Review previous risk control recommendations
- Review technical information about risk
- Fire Equipment Tests
 - Fire Pump Tests
 - Fire Hydrant Flow Test
 - Fire Door Closure Test
 - Smoke Detection & Alarm System Test etc.
- Time management



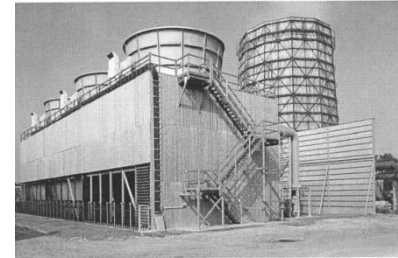
Procedures during Site Visit

- Meet Plant Management
- Review any changes in the facility
- Status of previous recommendations (if any)
- Loss History
- Loss Control Program & Self Inspection Reports (NFPA 25 / 72)
- Competence & Training of employees
- Business Continuity & Emergency Response Plan
- Procedures for handling impairments



Site Observations & Inquiries

- Building Structure
- Roof System
- Process Equipment
 - Cooling Towers
 - Product Storage Tanks & Bins etc.
- Smoke & Heat Venting / Exhaust
- Plant Utilities
- Operations & Processes
- Special Hazards



Site Observations & Inquiries (Contd...)

- Storage of Raw & Finished Products
- Production Method & B.I Potential
- Fire Barriers
 - Fire Walls
 - Fire Doors etc.
- Fire Suppression System & Water Supplies



Site Observations & Inquiries (Contd...)

- Site Exposures
 - On site
 - Off site
- NatCat Exposures



Earthquake



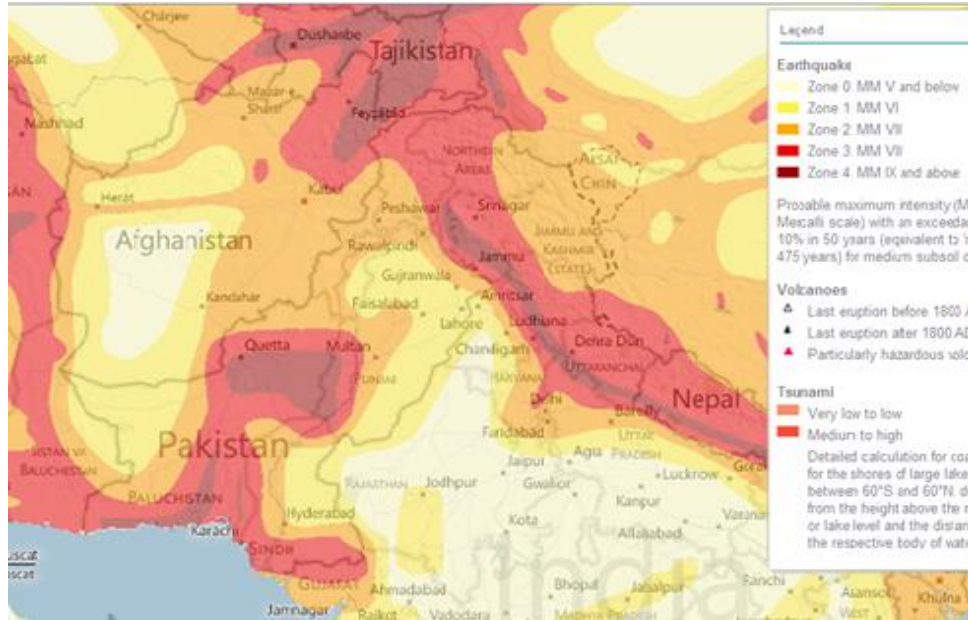
Flood



Wind Storm

Nat Cat Exposures

- Site Global Co-ordinates [Google Earth]
- Munich-Re Nathan Online Database
 - Earthquake [Zone 0 – 4]
 - Flood
 - Tsunami etc.



Hazard Score Rating

Hazard zoning values for significant natural hazards

	low	high	hazard rating
Earthquake	[Progressive color bar from yellow to black]		Zone 1
Volcanoes	[Progressive color bar from orange to black]		No hazard
Tsunami	[Progressive color bar from light orange to black]		No hazard
Tropical cyclone	[Progressive color bar from light green to black]		No hazard
Extratropical storm	[Progressive color bar from yellow to black]		No hazard
Hail	[Progressive color bar from light purple to black]		Zone 2
Tomado	[Progressive color bar from light green to black]		Zone 2
Lightning	[Progressive color bar from yellow to black]		Zone 4
Wildfire	[Progressive color bar from light green to black]		Zone 2
River flood	[Progressive color bar from light blue to black]		Zone 100
Flash flood	[Progressive color bar from light blue to black]		Zone 4
Storm surge	[Progressive color bar from light blue to black]		No hazard

Security Risk Assessment

- It's a totally changed environment
- Guards and fences – don't work anymore
- Technology does
- CCTVs, Metal detectors, Scanners
- Employee and Visitor access
- Restricted access
- Document and electronic security



Property Risk Evaluation Report - Results

- Accurate underwriting information
- Updated status of previous recommendations
- Production, as necessary, of new loss control recommendations
- Improvement of the **Risk**, preserving the **investment**, continued **operation** and **profitability** of the Client's site



Reference Material

- NFPA Standards + Handbooks
- FM Global Data Sheets
- Peer assistance etc.



Underwriting Considerations for Risk Assessment

Categories

- Factors which affect acceptance
- Factors which affect terms

Factors which affect acceptance

- 1) Factors which cannot easily be changed for the better
 - Proposer's Business
 - Proposer's Premises
 - Trade Process
 - Heating System (fixed type)
 - Other Occupants

Underwriting Considerations for Risk Assessment

Factors which affect acceptance

2) Factors which can be changed for the better

- Waste Control
- Congestion Control
- Work flow
- Maintenance
- Cleanliness
- Training
- Segregation
- Extinguishers

Underwriting Considerations for Risk Assessment

Factors which affect terms (Same as previous factors)

- Unacceptable Trade
- Acceptable Trade for Single Tenant premises
- Loss History (Worst)

Underwriting Considerations for Risk Assessment

Standard Risk Profiles and Deviations from them

Features	Standard	Deviation
Construction	Standard RCC Construction with Concrete Floor	Not built of Brick or similar walls or not roofed with incombustible material, with no concrete floor
Height	Single Storey Building	More than 01 storey with wood floors on upper storey
Tenant	Single tenant	More than one tenant
Smoking	Prohibiting smoking on the premises	Not banned or not confined to safe designated areas
Tidiness	Sweeping out at least daily	Casual waste is allowed to accumulate
Light & Power	Only fixed mains fed electricity	No fixed main electricity
Segregation	Segregated Processing and Storage areas	Processing and Storage not segregated
Maintenance	Shutdown Plant every 2 months for routine maintenance as per OEM recommendations	Not carried out to machinery manufacturer's recommendations

Plant Inspection











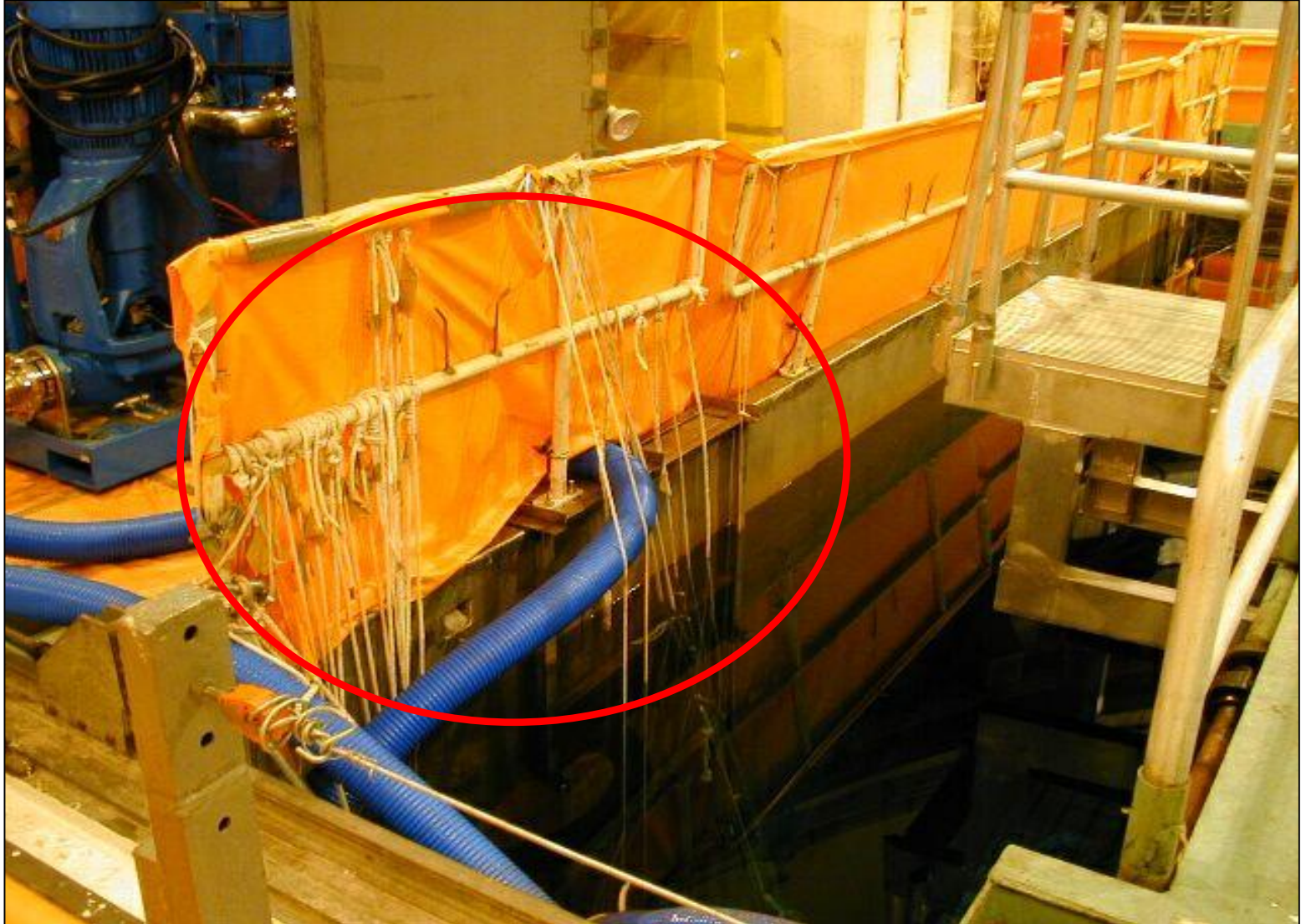


Keep the
door closed

1号機

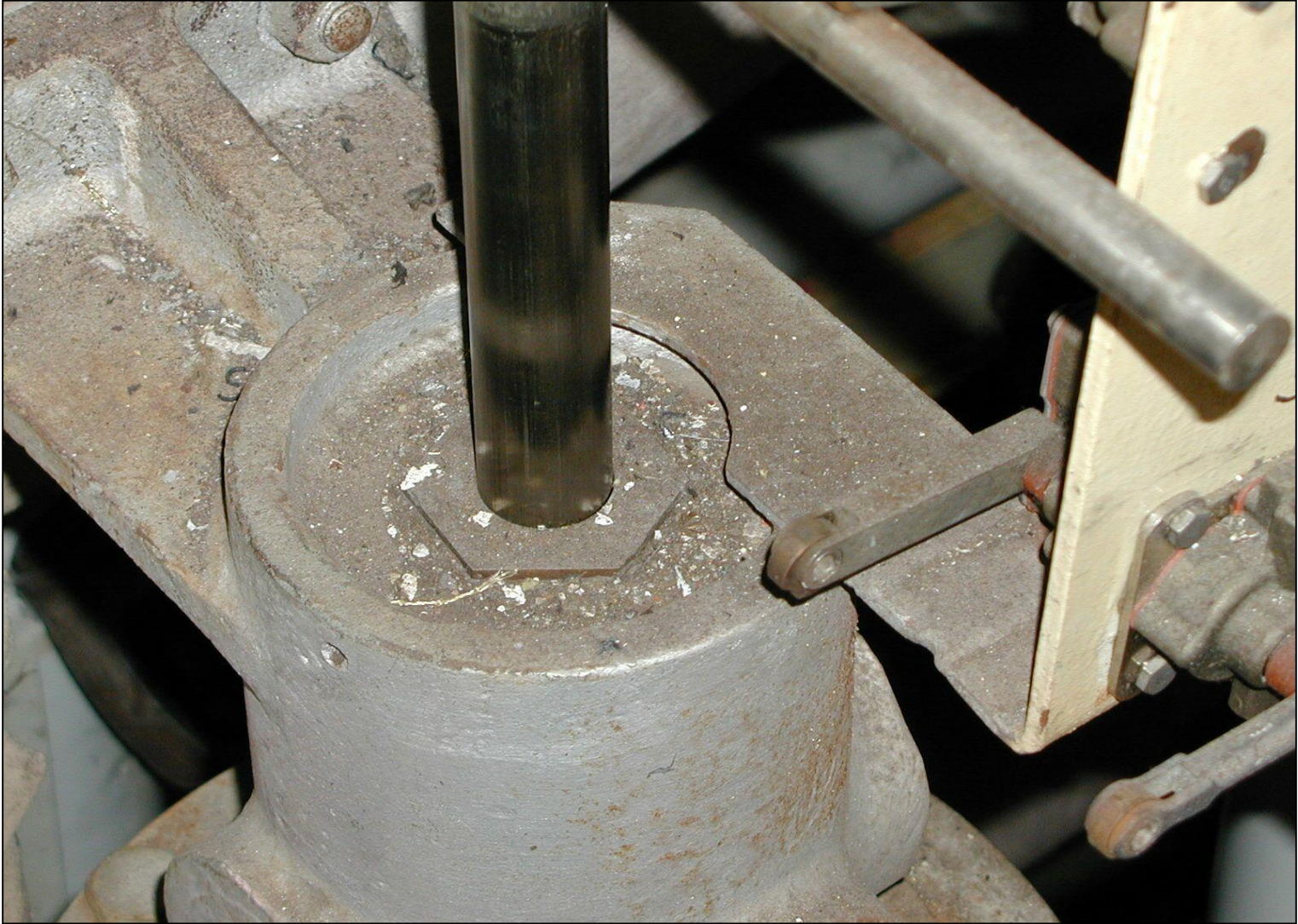


1号機設置
EL4.0















The yellow line was
Acetylene !





2016/10/27



Final Thoughts!

- Highly specialized field
- Part of Core Business
- Alignment with Client's overall risk management objectives
- Continuous improvement of insurable risk

Thank you!