Loss potential hunters: Higher education version

March 4, 2021
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The Zurich Services Corporation

Risk Engineering National Accounts
Property assessment results
Current property risk quality

Split of Risk Quality Levels - Fire

Completed 2/26/2021
99 Property Risk Assessments
Property assessment results
To be property risk quality

To Be Risk Grades

- Excellent: 75%
- Good: 25%
Property assessment results
Probable Maximum loss vs. Risk grades

PML Overview - Fire

- Poor: >150
- Fair: 101 - 150
- Good: 51 - 100
- Excellent: < 51
### Property assessment results
MHEC Defined critical recommendations

<table>
<thead>
<tr>
<th>Customer Category</th>
<th>Defined Recommendation</th>
<th>Current Number Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Hot Work Management (lack of program)</td>
<td>26</td>
</tr>
<tr>
<td>B</td>
<td>Impairment Management (lack of program)</td>
<td>19</td>
</tr>
<tr>
<td>C</td>
<td>Roof Maintenance (lack of semi-annual, formalized &amp; documented inspection protocol – can be in-house or contractor) Or, Roof Deficiency (observed damage, imminent loss)</td>
<td>44</td>
</tr>
<tr>
<td>D</td>
<td>Fire Pump/Water Supply – major deficiency (i.e. a reduced pump test curve is not a critical deficiency unless it becomes inadequate for the fire protection demand) Or, Fire Pump/Water Supply – major deficiency (i.e. a reduced pump test curve is not a critical deficiency unless it becomes inadequate for the fire protection demand)</td>
<td>3</td>
</tr>
<tr>
<td>E</td>
<td>Flammable liquids/ spécial hazard – LE&gt;$10M</td>
<td>1</td>
</tr>
</tbody>
</table>
MHEC Jurisdictional for 2020-2021

- Approx. 5000 objects at almost 1000 locations
- In the last year:
  - 1896 inspections completed
  - Over 230 recommendations made
  - Over 200 violations found
Common issues

- Leaks
- Pressure Relief valves (PRV)
  - leaking
  - not working properly
  - capacity or set pressure (too high or low)
  - testing program
  - PRV discharge piping
- Pressure gauge
- Name plates obscured or missing (vessel and or PRV)
Maximizing efficiency and safety

• How to: Maximize boiler efficiency
  – boiler water chemistry
  – proper burner tuning
  – replace Worn parts
  – check for leaks
  – make sure combustion air inlet is unobstructed

• Conducting annual maintenance helps
  – improves safety
  – reduces operating and energy costs
  – extends life of boiler
Boiler daily maintenance

• For example:
  – blow downs and test low water cut-offs
  – blow down gauge glasses
  – blow down the boiler
  – check boiler and system for leaks
  – check burner flame
Boiler monthly maintenance

- For example:
  - check boiler water treatment test results and adjust as necessary
  - lubricate motors and equipment bearings
  - test fans and air pressure interlocks
  - check main burner fuel safety shutoff valves for leakage
  - check low fire start interlock
  - check high pressure/temperature interlocks
  - check high- and low-pressure interlocks on gas train
  - check safety valve
Boiler annual maintenance

- For example:
  - check all equipment coils and diaphragms
  - recondition or replace low water cut-off
  - check gas drip leg and gas strainer
  - clean boiler firesides
  - drain boiler, open manholes, handholes, and clean water sides
  - have boiler inspected by a commissioned inspector
  - clean burner and fans
  - replace gaskets
  - leak test all fuel valves
  - test operation of all controls and safety devices
  - adjust combustion
  - test and re-certify boiler monitoring system
How to contact Commissioned inspector to schedule an inspection

- Contact local Risk Engineer directly (if known)
  - Zurich Machinery Breakdown Risk Engineer
  - One CIS (3rd party)

- Contact Account Manager if local engineer is not known
  Irfan Ahmad
  Irfan.ahmad@zurichna.com
  630-673-1323

- Call Zurich Jurisdictional Hot Line - 800-562-5814

- Zurich On Line Boiler Inspection Request
  - Google: Zurich Boiler inspection request
On line Boiler Inspection Request

Boiler Inspection Requests can be reported to Zurich via online form or phone.

1. Complete the online form

Instructions: Enter the requested information and click on the Next button. At the bottom of the form, click Submit to complete your inspection request.

Upon submitting the inspection request, a confirmation will be emailed to you. Please save this email! It also includes contact information if your inspection request is of an immediate nature.

For the best user experience, please use an up to date version of your web browser. You may also need to open access in your firewall and spam filter to receive email confirming your inspection request.

2. Call us by phone:

Request Hotline 600-552-5814
Machinery Breakdown Regional Manager Contacts

Privacy Policy | Legal

Attention: The Zurich Group Companies and SurveyGizmo's software used to operate our inspection request system are located in the U.S. Zurich has appropriate measures and controls in place to ensure that this data transfer is carried out securely and in compliance with our legal obligations. If you do not care to complete this form, please exit now.
Fill out contact information

Contact Information

Name - First, Last *This question is required.

Title or Department *This question is required.

Telephone Number *This question is required.

Email Address *This question is required.

Additional Contact Name - First, Last
(e.g., coworker, manager, owner, etc.)
(enter "N/A" if no alternate contact available)
*This question is required.

Additional Contact's Email Address
(e.g., coworker, manager, owner, etc.)
(enter "N/A" if no alternate contact available)
*This question is required.

Additional Contact's Telephone Number
(enter "N/A" if no alternate contact available)
*This question is required.
Fill out location information

Location Information

Account/Company Name *This question is required.

Other Company/Location Name

Street *This question is required.

City *This question is required.

Zip Code *This question is required.

County *This question is required.

State *This question is required.

Province/District

Zurich Policy Number if available/known

-- Please Select --
Fill out Inspection information

**Inspection Information**

Type of Inspection (select any that would apply) *This question is required.*
- [ ] External
- [ ] Internal
- [ ] Other

Equipment to be inspected if known (select any that would apply) *This question is required.*
- [ ] Hot water heater
- [ ] Low pressure steam boiler
- [ ] High pressure steam boiler
- [ ] Hot water heating boiler
- [ ] Hot water supply boiler
- [ ] Air tank
- [ ] Unfired pressure vessel
- [ ] High pressure, high temperature boiler
- [ ] Fired pressure vessel
- [ ] Unknown/other

Reason for inspection *This question is required.*
- [ ] Operating certificate renewal
- [ ] New installation certification
- [ ] Other

State Registration / Certificate Number(s) if available:

Certificate due date(s) if known:
(e.g., mm/dd/yyyy use comma to separate dates)
Comments
(Best time to visit, best time to call for appointment, special rules to enter facility, etc.)
Thank you

Risk Engineering
www.zurichna.com
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Infrared Testing of Energized Electrical Assets
MHEC 2021
4 disciplines of Electrical Risk control ...
A logical progression

Infrared Inspections

Arc Flash Hazard And Training

Lock Out Tag Out

Infrared Windows
Electrical failure is a leading cause of fires in all types of facilities. Infrared is the only PM to detect thermal problems early on the failure cycle.

On average 5-8% of all assets have at least one thermal or compliance anomaly, none get better on their own.

NFPA suggested Infrared inspections should be conducted regularly (every 1-3 years) depending on tolerance to failure, and mean time to repair.

The average Thermal anomaly wasted about $1.00 a day in energy. Inspections tend to pay for themselves.

Opening cabinets and dead fronts introduces the possibility of shock or flash and should be done only by trained technicians with proper PPE and NFPA 70 E safety training.

You cannot do this with panels covers or dead fronts on. No repairs or PM tasks should be done on energized assets.
Typically, what is inspected

All Electrical energized and accessible systems and components

• Power Distribution
• Substations
• Breakers
• Fuses
• Panelboards
• Transformers
• Motor / Generator Control Centers
• Starters and Thermal Overloads
• Disconnects
• Bus Connections
• Relays
• Electrical Vaults
• Transfer switches
• Voltage Regulators
• Distribution Panels/sub panels
• Mechanical/Motors and drives/bearings/belts/anything as directed

Or whatever we are directed to inspect, that is safe and operational
Typical Thermal Problems – By Type

1) Loose connections (80%)  
2) Faulty Parts/Internal Flaw (10%)  
3) Overloads > 80% (NEC Code) 7 %  
4) Phase Imbalance/Other 3%

- By Criticality (delta temp to normal) takes load into consideration
- Determine Probable Cause/Recommended repairs
- By Asset Criticality-Non essential, Essential or Critical to operations
How do we determine heat “relevance”

• Patented software with heat curve calculation (“T-Max corrected”) confirms problem severity

• Thermal anomalies measured against “normal” (not ambient) using rated vs measured @ ambient vs “heat curve” or rated rise

• Problem forecasting at different equipment loads as an example

• Global standards for data collection/handling ensures consistency of information and trending.

<table>
<thead>
<tr>
<th>Measured Amps:</th>
<th>3 Amps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Amps:</td>
<td>20 Amps</td>
</tr>
<tr>
<td>Room Temp:</td>
<td>73°F</td>
</tr>
<tr>
<td>Problem Temp:</td>
<td>124°F</td>
</tr>
<tr>
<td>At 50% Load:</td>
<td>243.00°F</td>
</tr>
<tr>
<td>At 100% Load:</td>
<td>413.00°F</td>
</tr>
<tr>
<td>Maximum Temp:</td>
<td>74.53°F</td>
</tr>
</tbody>
</table>

Defines and confirms 4 levels of criticality

- Minor-
- Important-
- Serious-
- Critical-
We also catalogue NEC and OSHA code violations. Non-Thermal problems can be just as dangerous as the most critical thermal ones...worse.
PPE is dictated by ratings on labels and proximity to restricted boundaries.

### INCIDENT ENERGY ANALYSIS METHOD*

<table>
<thead>
<tr>
<th>PROTECTIVE CLOTHING AND PPE</th>
<th>INCIDENT ENERGY EXPOSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;1.2 cal/cm²</td>
</tr>
<tr>
<td>Protective Clothing, non-metallic in accordance with ASTM F1506 or unlabeled thermal clothing, long sleeve shirt and pants or overalls</td>
<td>✓</td>
</tr>
<tr>
<td>Delta gloves</td>
<td></td>
</tr>
<tr>
<td>Hard hat</td>
<td>✓</td>
</tr>
<tr>
<td>Hearing protection</td>
<td>✓</td>
</tr>
<tr>
<td>Leather footwear</td>
<td>✓</td>
</tr>
<tr>
<td>Rubber insulating gloves with leather protectors for arc and flash protection</td>
<td>✓</td>
</tr>
<tr>
<td>Arc rated long sleeve shirt and arc rated pants or arc rated coverall</td>
<td>✓</td>
</tr>
<tr>
<td>Arc rated toe shoes and arc rated booties</td>
<td>✓</td>
</tr>
<tr>
<td>Arc rated and flame resistant hood, jacket and pants</td>
<td></td>
</tr>
</tbody>
</table>

*This table is for use only when an incident energy analysis has been completed. If incident energy exposure has not been determined, refer to NFPA 70E-2018 Edition for PPE Category Method.*
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