Electrial Safety
LS2 days

7 - 8 November 2016

AP.Bernardes/EN-STI on behalf of LS2 project

Acknowledgments: C.Bedel/EN-ACE, P.Gallay/EN-EL, D.Hay/EN-ACE, C.Mugnier/TE-EPC

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CERN | EN ENGINEERING DEPARTMENT

Outline

- Electrical Safety Tips
- Lock out activity
- Summary

Electrical safety tips

Unknown power supply

Example of faulty protection
Source: PS-CSAP 34th and 35th Meeting

If your equipment is concerned by a safety non compliance:

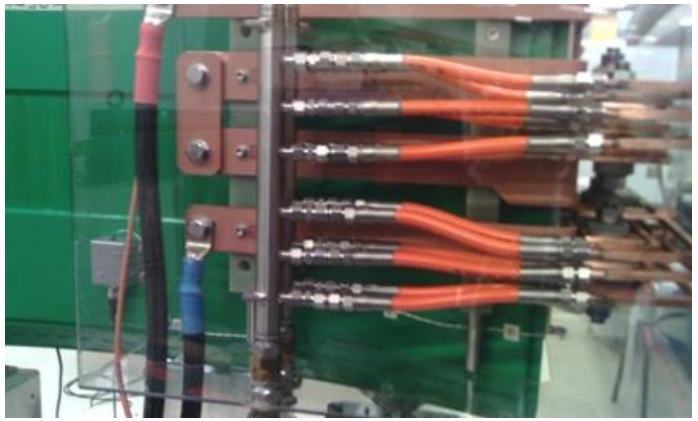
Please, include the reparations in your maintenance plan as any other technical maintenance.

The list of non compliances may be checked before the EYETS with the HSE contact person O.Tison or JP. Julien

If some recommendations are not applicable for technical reasons, please do not hesitate to discuss it with HSE/SEE and if needed with your DSOs

Electrical safety tips

Example of non compliant cover
Source: PS-CSAP 34th Meeting



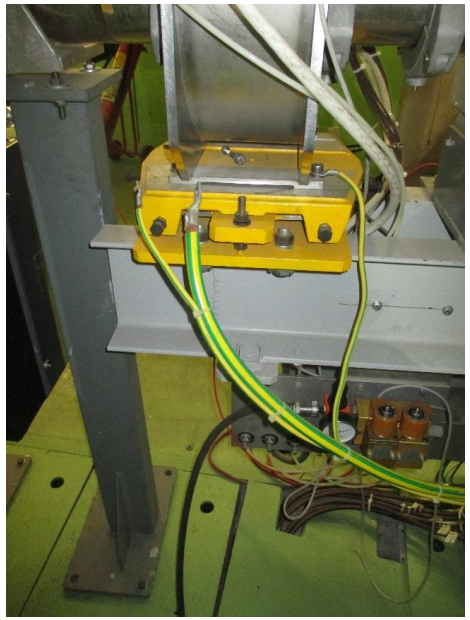
Example cover IP2X (Source EDMS 1455055)

If you are **refurbishing or upgrading** an electrical equipment:

Contact HSE to have a look at **your equipment before its dismantling** or when it's located on **your test bench. If electrical safety actions are required you will have more time to act!**

Contact person: Electrical-Verifications.Service@cern.ch

Electrical safety tips



Electrical ground not connected
Source: PS-CSAP 34th Meeting

Once your equipment is installed inside the machine and your intervention is finished. Before removing the lock-out:

Please, plan a survey of all the electrical safety aspects concerning your equipment:

- **Grounding of the equipment**
- **Grounding of the frame**
- **Electrical safety covers in place**
- **Electrical safety labelling in place etc.**

On demand only: you can request HSE/SEE to be present during your survey: Electrical-Verifications.Service@cern.ch

Electrical safety tips

Example of hazard combination
Water and electricity (state of the cables?) + Radiation

WDP with ALARA principle, DMC alarm and HSE/RP survey are protecting you against irradiation hazard!

Only the quality of the lock out procedure will protect you against a potential fatal injury!

- Decide in your group/section **who should be authorized** to perform a lock-out procedure on your equipment for your activities (BR/HR) and/or for other groups' interventions (BC/HC).
- Update your training "Habilitation électrique" BR/HR or BC/HC before the EYETS
- Ask your supervisor to sign your "titre d'habilitation électrique"

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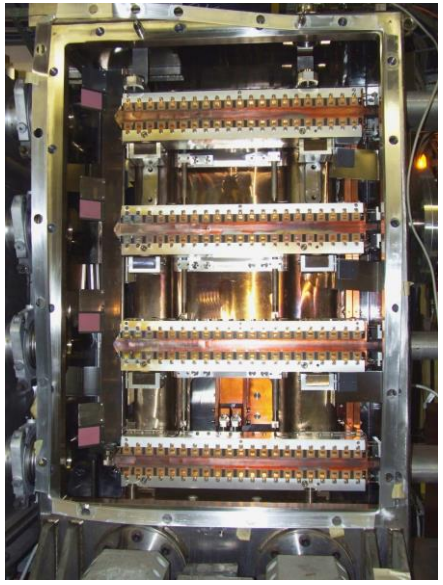
Lock out activity

- Lock-out Survey done on PSB
  - Survey Focus: Assess the roles and responsibilities for the process of ”Consignation électrique” and assess the compliance with CERN rules (NF C 18-510)
    - See LS2 committee: Indico 504062
- Why this survey?
  - *Are the “Consignation électrique” practices homogenous between the machines?*
  - *Are the Roles and responsibilities well established and understood for the process of “Consignation électrique” in injectors?*
  - *Are we applying the CERN electrical rules on field or could we improve the situation?*

Concerning only the electrical Hazards

Lock out activity

Lock-out launch for the equipment owner (inspection, maintenance, reparations etc.) – Specific location



Very usual → Well mastered, close to what is requested by the NF C 18-510 standards

Lock-out launch for interventions performed by a group different from the equipement owner (Work distributed in diff locations, external contractors etc.)

Propose a solution and test it during EYETS 2016.2017 on PSB

Not so u → More electrical roles involved. More difficult to comply with the NF C 18-510 standards

Lock out activity

Identify **resources** and **methods** to support the groups on field during transversal interventions:

The proposal should find an answer to the following questions:

- ***Did we identify all the equipment concerned by the lock-out process before the intervention?***
    - Identify and Document the equipment concerned by a lock-out procedure for the most important transversal activities

- ***How can I be sure that the electrical state of different equipment close to my working place is safe before my intervention***?
    - Identify and Document the desired conditions to be able to deliver "une autorisation de travail" for the most important transversal activities

Lock out activity

Proposal under discussion:

Assign an electrical reference person to support the groups a ACE

Example of activity: BHZ151 vacuum chamber consolidation

Working supervisor:
TE-VSC-BVO

Group concerned by the lock-out procedure:
TE-EPC
TE-MSC-MNC
BE-BI-BL
TE-VSC-B
TE-A

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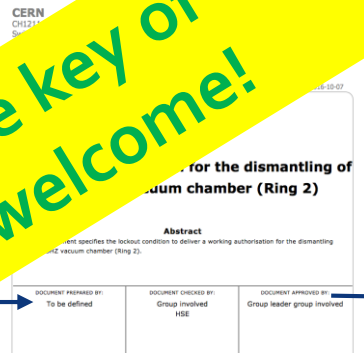
d by the lock-out
ocess with the PSB
acility coordinator and the groups

Your collaboration is the key of the success. Proposal welcome!



Step 2: Define a check list of the lock out process with the groups concerned (reference person + PSB facility coordinator + groups)

Validation through EDMS (Link with the "layout data base")

Step 3: Circulation in EDMS and approbation

Based on the check-list deliver an "autorisation de travail" to the groups concerned:

TE-MSC-MNC
BE-BI-BL
TE-VSC-BVO
TE-ABT

Step 4: Possible to deliver an "autorisation de travail"

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Summary

For the EYETS, YETS and LS2

- Include any safety non compliances in your maintenance plan,
- If you refurbish or upgrade an equipment, check for non compliances before dismantling or on the test bench, to have time to act,
- Organize a survey to check that the safety elements are in place before removing the lock-out on your equipment,
- Identify who can perform a lock-out procedure and keep his/her training and ”titre d’habilitation” updated and signed,

Summary

- The quality of the lock-out process is important to protect people against electrical hazards
  - The LS2 project is proposing to reinforce resources:
    - to test a pilot methodology on PSB
    - to improve the lock-out process for transversal electrical activities

→ Your collaboration and feed-back from field is the key for the success of this proposal!

- If you volunteer to try to implement this methodology for your activities, please do not hesitate to contact me!

Questions?