Machine operation and daily maintenance management in SOLEIL
Summary

- Objectives
- Failure duration
- Interventions
- State of our organization
OBJECTIVES
Objectives: **5500 hours of operation per year (5000 hours for 2013)**

### 2013: Operation schedule

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Machine operation and daily maintenance management in SOLEIL

Workshop Asset and Maintenance Management Workshop November 13 - 15
Objectives: 99% of photon beam availability

Efficency during beamlines an RP sessions in 2013
3929 hours of beamtime delivered represent a beam availability of 97.8%
Objectives: A meantime between failure of 100 hours

MTBF: Meantime between failures (56h30)
et MTTR: MeanTime To Recovery (1h14)
during beamlines and RP sessions in 2013
Objectives

- To continue the installation of new equipment
- To ensure high reliability (Operation / Maintenance)
The record of the failure by the operator automatically sends an email to the concerned group

**Symptome:** Perte faisceau sur Interlock vide TDL SAMBA

**Diagnostic:** Dédouchement du Deb 1 de la TDL SAMBA

**Remède provisoire** "feu orange": en accord avec l’astreinte vide, sortie du Deb de la chaîne puis mise dans la chaîne du TC7. Un équilibrage est nécessaire
Discussion and preparation: Five main meetings

1) OASIS meetings (every Week)
   To discuss and analyze equipment problems and events on the beam

2) Command-control meetings (at the beginning and the end of the run)
   To discuss and analyze the computing problems and developments

3) Retour d’EXpérience (feedback) meetings
   To discuss and analyze the items that could bring improvements to the accelerators and photon beam performances. Proposals for the improvements on work organization, communication, procedures in order to increase our vigilance and minimize human errors.

4) « CONtrôle Technique des Equipements et Maintien des Performances » CONTEMP Meetings
   These meetings, according to the difficulties met, aimed at analyzing the recurrent failures and defining the actions to be implemented at short, medium and long term.

5) OASIS schedule for shutdown
   Several meetings focused on the implementation of the schedule of the next shutdown

3Hz Booster dipole power supplies: upgrade IGBT class (400A to 600A) but was not sufficient. The number of operating cycles is larger than expected. A redesign of these units is progressing.

A new dipole storage ring power-supply (580A / 610V +/- 10ppm), has been in-house developed. Switching between power supplies takes less than 5 minutes.
Compressed Air

An interruption, for few minutes, of the superconducting RF cavities liquefactor generates their unavailability during several hours

July 2012 : compressed air failed but no Beam loss!!!
Thanks to new cylinders installed at the compressor and CRYO
=> Several beam losses of at least 6 hours have been avoided !!!

Technical shutdown of August: Installation of 18 cylinders on the main circuit allows us a 2-hours autonomy
A failure

Discussion, at the beginning and the end of a run, in command-control meetings dealing with computing problems and developments

ELOG ENTRY

Discussion at the weekly meeting every Thursday called OASIS

Establishment of temporary instructions

resolution of the problem during the dedicated physical time sessions or during shutdown

Solved, temporarily or finally by operators or by oncall person

automatically sends an email to the concerned group

Recurrent problem or needing a focus at medium or long term

Discussions, in small groups, in two specific meetings called REX and/or CONTEMP

Implementation of procedures and/or changes during shutdown

development of the schedule for shutdown in several meetings

Discussion, at the weekly meeting every Thursday called OASIS

Establishment of temporary instructions

resolution of the problem during the dedicated physical time sessions or during shutdown

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Implementation of procedures and/or changes during shutdown

development of the schedule for shutdown in several meetings
INTERVENTIONS
Interventions

Depending on the priority, resolution of the problem:

A) either while Machine dedicated time

B) Or during shutdown period
Interventions during Machine dedicated time

Using Jira Software since 2 months

Every Intervention is validated in OASIS meeting or by 3 persons (part of Accelerator coordinator and Operation Group)
Interventions during Machine dedicated time

1 chart summarizing all the interventions of the next Monday is automatically sent every Friday to all the participants

<table>
<thead>
<tr>
<th>Clé</th>
<th>Résumé</th>
<th>Descriptif</th>
<th>Rapporteur</th>
<th>Date d'intervention</th>
<th>Accès contrôle</th>
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<tr>
<td>FCIN-76</td>
<td>Intervention SPESO</td>
<td>Vérification détecteur SPESO</td>
<td>CASSINARI Lodovico</td>
<td>04/nov./13</td>
<td>LB1</td>
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<tr>
<td>FCIN-75</td>
<td>Intervention sur un capot du transport</td>
<td>Retrait d'une collerette sous le hublot de sortie du MIR001, remplacement temporaire par une bande d'alu scotchée</td>
<td>TORDEUX Marie-Agnès</td>
<td>04/nov./13</td>
<td>AS1</td>
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<td>laser/photons wiggler du slicing (vers</td>
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<td>MIR001) dans le tunnel</td>
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<td>FCIN-74</td>
<td>MAJ contrôle commande W164</td>
<td>Test de mouvements d'offset sur les onduleurs sous-vide Mise à jour de l'automate du W164 + Tests de pilotage</td>
<td>CHAPUIS Lilian</td>
<td>04/nov./13</td>
<td>Aucun</td>
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<tr>
<td>FCIN-73</td>
<td>intervention préparation manip FluoX</td>
<td>Installation Caméra + film GAFCHROMIC</td>
<td>HUBERT Nicolas</td>
<td>04/nov./13</td>
<td>AS1, AS4</td>
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<td>FCIN-72</td>
<td>Vérifications interlock fluides sur</td>
<td>Vérifier qu’en l’absence d'eau de refroidissement d’une part, d’air comprimé d’autre part, l'insertion du MIR001 Slicing est interdite. Pour cela, nécessité de fermer successivement pendant quelques minutes d’abord la vanne d'arrivée de l’eau de refroidissement d’une part, ensuite la vanne d'arrivée de l’air comprimé d’autre part.</td>
<td>CASSINARI Lodovico</td>
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<td>AS3</td>
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<td>MIR001 Slicing</td>
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<td>FCIN-71</td>
<td>essais sur les pompes 21°C</td>
<td>Permutation de la pompe en fonctionnement vers la pompe en défaut, enregistrement des paramètres: T° moteur, T° Démarreur, courant Fonctionnement 2 pompes en parallèle, enregistrement des paramètres.</td>
<td>DIDIER Thierry</td>
<td>04/nov./13</td>
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<td>BATIMENT T3</td>
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Interventions during shutdown

- To fix the problems that occurred during the last RUN

- To do the preventive maintenance of the equipment already installed, using CMMS software

- To continue the installation of new equipment
Installation during shutdown => Example of installation for the Femto-Slicing
### Installation during shutdown => Example of installation for the Femto-Slicing in May 2012

#### TACHES

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<th>Ressources</th>
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<td>Retrait des sondes de températures colis sur le dalot C05H16 avant le retrait des dalots</td>
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<td>Housse de la position de L/H 2 de 10h à 12h</td>
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#### 70 identified tasks that keep coming

#### 11 groups involved:

- **Alignment, Electric, Fluids, Mechanics, Craneman, Vacuum**
- **Power supply, Diagnostics, Magnetism, Operators**
- **Radioprotection**

#### Optimized planning according to various constraints (Worktime, cohabitation): Work shift, holiday and weekend

Each skill is important, all the tasks have to be done in a defined order

#### Machine operation and daily maintenance management in SOLEIL

#### Workshop Asset and Maintenance Management Workshop November 13 - 15
All the consignment certificate must be filled before the allowing staff goes working in the rings.
The interventions: The work permit

All the interventions **into the ring** have to be indicated in a work permit

Security and radioprotection groups mention all the safety rule instructions for the intervention

Validation by the Operation group and the workers before starting the intervention
The interventions: Intervention on Safety System

Must be filled if the safety system is impacted by the intervention

Validated by Safety group at the beginning and at the end of the shutdown
Our current organization allows us to have a significant gain on the reliability, the use of equipment and the improving of our responsiveness. However, to make it more efficient, we have to optimize the meetings to avoid the “lost time”

All interventions must be tracked and consultable at any time
=> using CMMS Software

A study is in progress to simplify all the paperwork during shutdown (with Jira)

Having a single software portal (will be introduced in Pascale BETINELLI’s presentation)
Thank you for your attention

Any question?