Cabling activities: Strategy for a new project
Introduction

This is a description of the general strategy concerning the organisation of cabling campaign for new projects.

In the oldest accelerators structures, the cable ladders are overloaded and it is nowadays impossible to install quantities of cables for a new project.

The general strategy for the removal of the unused cables is explained too.

Content

Part 1: Removal of the unused cables: strategy and work methodology

Part 2: New cabling campaign: general strategy
- Preparation
- General schedule for a new project,

Part 3: Booster specificities.
Why?

On site:

- Eliminate old and unused system.
- Simplify the links between racks and control rooms.
  If necessary, remove the patch panels
- Recuperate the space in the cable ladders and in the civil engineering passages
- Eliminate as much as possible the cables containing halogen

Documentation:

- Updating the layout of the racks and the cable Data Base (cablotheque)

Principle:

The more the quantity of cables to remove is important, the more this operation will be effective: cost, feasibility and planning.
Part 1: Preparation project

Volume estimation of the unused cables

Identification of the cable ladders or passages concerned

Estimation of the total length

Identification of the starting points

Schedule proposal

Ressources definition

Dose level estimation: ALARA comittee

Technical and adm. preparation

Upon the receipt of the list of the unused cables established by the users. (See EDMS 1149428)

Accessibilities to the cable ladders - schaffoldings, lifting equipment, etc…

Estimation of the waste of irradiated cables.

Price estimation

Storage of the irradiated cable waste.

Work Supervisor, transport, RP, etc…

Process definition to reduce the dose level taken by the workers.

Volume estimation of the unused cables

Engineering Department

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JCG/LIU Booster

3/1/2012
Engineering Department

Part I: Removing the unused cables

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Racks

Racks

Shaft

Shaft

Racks

Ctrl room

Converters

Racks

Racks

Racks

Racks

Direction of the removal

Accelerator area = Radioactive area?
Identification of the unused cables

1) For the oldest system, nobody knows …

2) Users would like to keep the cables as reserve ….

3) Cables without numbers, and no documentation ….

During the works

1) Electrical risks,

2) Possibility to remove a ‘good’ cable.

3) Impossibility to remove because of the inaccessibility of the cable ladder, equipment, area, etc…
A cable is a link between 2 functional positions - origin and destination. It is defined by a type and it will be installed on dedicated cables ladders.

**STEP 1:**
On the base of a preliminary layout (machine and ctrl rooms), the users established a first list of new cables containing the following information: type of cable, quantity, origin and destination.

1) Type of cables: following our list of standard cables (IS23).

2) Functional Position - origin and destination: the codification must follow the rules defined in the area.

3) Dedicated cables trays: Ctrl, power (DC and AC), safety and specified cables trays to avoid EMC.
With the first information given by the users:

- Length estimation of each link,
- Definition of the total quantities for each item.

**Supply of material**
- Calculation of quantities
- Price estimation
- Ordering of material

**Layout**
- List of racks per system
- Naming of FP (Boxes)

**Infrastructure**
- Passages Génie Civil
- Functional Position layout

**Cabling**
- Size of the cable ladders
- 3D intégration of cable ladders
- Installation priorities
- Installation of the cable ladders

**Cable requests (DIC)**
- Definition of the cabling campaign
- Cable database preparation
- Worksite preparation

**Installation**
- Rack installation

**Rack installation.**

**Cabling activities: Strategy for a new project**

- 12 months
- 18 months

3/1/2012
- Study of the cable request (DIC)
- Installation cable ladders and racks
- Call for tenders, non standard material
- Price estimation global/per system:
- Ordering of standard material
- Cable data base preparation
- User verification
- Preparation of the technical documentation
- Beginning of the works

The duration may vary with the quantities and the number of cabling campaign.
The preparation methodology is the same that for cables:

- Optical fibre requests: DIF - same principle as for cabling.
- Supply of material: about 4 months for standards, about 12 months for special rad-resistant fibres (if required and depending on the quantities)
- Equipment layout: same

General schedule: same as for cabling:

- Infrastructure: installed by ‘cabling team’.
- Optical cabling:
  - Similar constraints than the copper cabling concerning the laying of the tubes.
  - Termination/measurement requires more time in place.

Optical fibre requests: DIF - same principle as for cabling.

NB: There are not Optical Fibres to remove.
## Part2: Cable/fibres request

### Technical details

#### Code ‘ouvrage’
- Functional position
- Element

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<th>No. Cable</th>
<th>No. CABLE</th>
<th>TYPE</th>
<th>RESEAU</th>
<th>FONCTION DU CABLE</th>
<th>ORIGINE</th>
<th>DESTINATION</th>
<th>LONG-(par E N-E L)</th>
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<td></td>
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<td>OUVRAU</td>
<td>Position Fonction.</td>
<td>ELEMENT</td>
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</tbody>
</table>

- **Code of the cable.**
- **Fonction of the cable:** 45 caract. max

- **Building:** Code ‘ouvrage’ civil engineering
- **Functional position:** Rack, cabinet, magnet, etc...
- **Element:** Electronic crate, etc...

#### Connectors, wiring conventions
- **Code of the connectors:** See list
- **Wiring connection:** See list.

#### Information concerning pos. of the connector in the extremities.
- **Cable number, code ‘réseau’, length:** Define par EN-EL

#### Comments: Constraints about the cable lengths, sensibility to the EMC, etc...
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Part 3: Specificity of the Booster

Installation: 1968
Cables: Oldest are with halogen.
A lot of cables have been pulled between the control rooms:
PS Ring Center, L12, CCR (354), MNR, etc..

Removing of old cables: A campaign took place during the 90’s.
A new one is now necessary.

Documentation:
- Layout of the BCER, BOR, BAT exists: (Drawings PS_EY____7001, 7002 and 7012)
- Integration of the cables trays exists on Euclid.

Cable data base:
- All the cable modified or installed after 1989 are inserted in the cable data base (= 6000 cables)
- All the cable installed before 1989 are documented in hand-written lists (= 11000 cables)
- The methodology for the removal of the unused cable is well known. It is based on the experience of the large cable removal carried on in the 90’s on the PS site.

- The methodology exposed for the installation of new projects have been already experimented in the AD, LHC, Linac4 etc...
Thank you for your attention.