What is planned for the long shutdown?

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Summary of sessions 2 & 3 from the 2011 LHC workshop at Chamonix

Chamonix 2011 sessions 2 & 3

- 16 talks
  - Testing for 7TeV operation before the shutdown; RP issues
  - Splices (what & how); DS Collimator installation; all other Cryo-magnet activities; R2E; work in Experiments
  - Vacuum; QPS; Cryogenics; CV; EL; Access & Safety
  - RF; kickers & dumps

- How long do we need?
  - What drives the length of the shutdown?
- 2012 or 2013?
  - Start in December 2011 or December 2012?
- Open issues

What drives the length?

- Ensure operation @ 7TeV & high beam intensity
  - Splice Consolidation
  - Cryo-magnet repairs
  - Experiments
  - R2E mitigation activities
  - Collimator upgrade (Installation in DS @ point 3)

- Ensure reliable operation & performance
  - Full Cryogenic, CV and EL Maintenance programs
  - Improvement programs; UPS, Cooling redundancy etc…
  - Individual system maintenance & upgrade programs
    - QPS, Safety, access, RF, kickers etc…

How long do we really need?

7TeV tests = 1 month

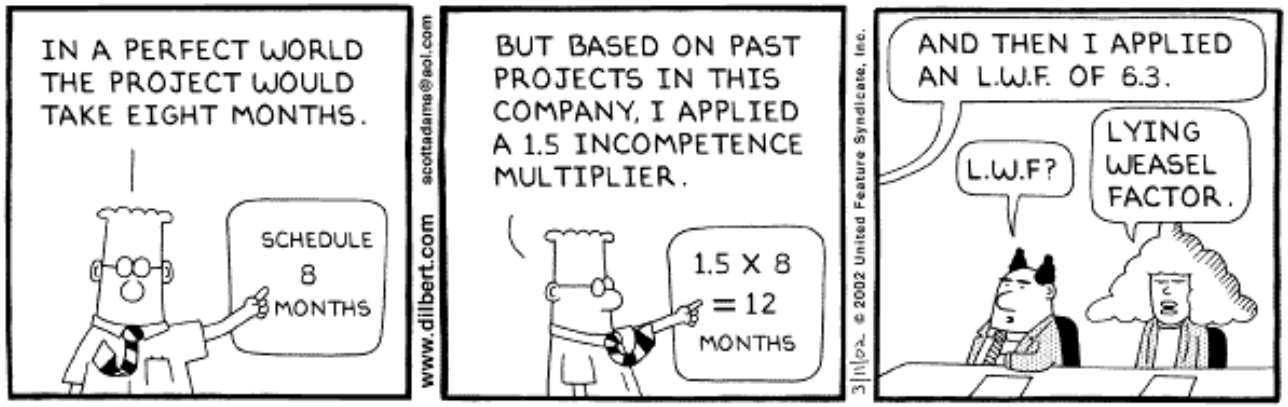
Warm-up = 1 month

Splice consolidation = 14 months

Same resources

Last Cool-down = 1 month

A HWC.. = 2 months



Experiments = 15 months

CMS bakeout?

Beam off

19 months

Beam on

2012 or 2013?

- Preference for 2012
  - EL, CV maintenance,
    - no full maintenance for 3 years(January 2009)
    - Reliability in 2012?
    - AUG UPS performance?
  - R2E: Concerns with SEU in 2012?
    - Will it affect luminosity production in 2012?
- Preference for 2013
  - DS Collimator
    - Availability of hardware
  - Kickers & Safety systems
    - Preparation/development time
  - Experiments
    - Uncover New physics
    - Discover Higgs particle
  - R2E
    - For major CE work to displace the safe room @ point 7
- Other issues for delaying to 2013
  - Experiments may advance work from 2016 to 2013/4 (special Be vacuum chambers)
  - Need 3 month technical stop at the end of 2011 (EN/EL & Experiments)
  - Additional Induced radio-activity (factor 2) is not a limiting issue (DGS/RP)

Open issues

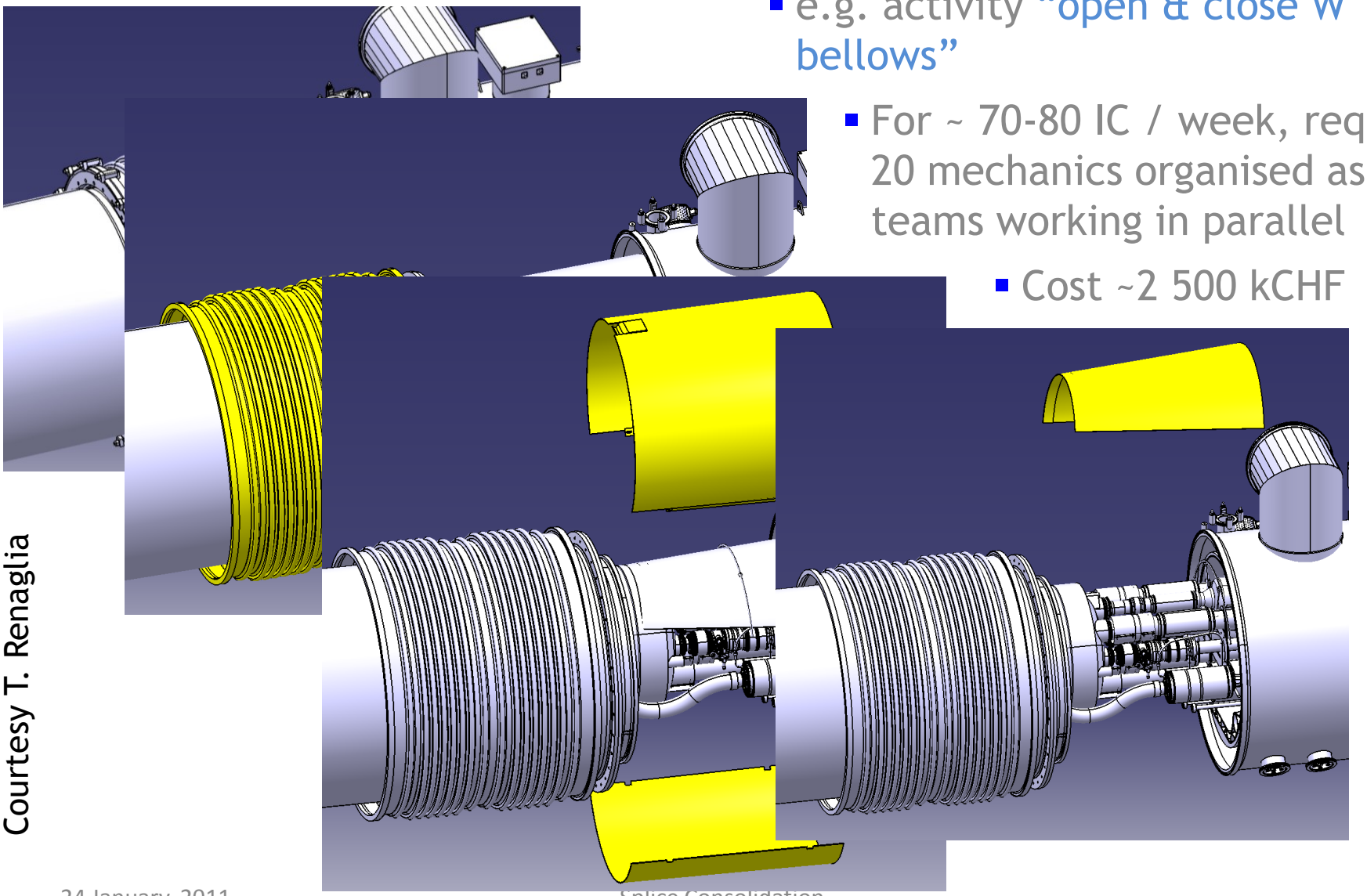
- Parallel activities
  - Splices, DS collimators & cryo-magnet repairs use the same resources from TE/MSC and elsewhere…
  - R2E, maintenance and upgrades of services, plus CCC, & bldg 513… need the same resources from EN/EL & EN/CV
  - Work in Injectors? LIU?
- We need trained experienced manpower
  - 60FTE (out of 200) “missing” for splices
  - <1/3 expert manpower for other MSC cryo-magnet activities
  - External Contractors need close supervision by CERN experts to avoid “mistakes”

Open issues

- Not planned to replace 12 MB's & 2 SSS in 3-4 with wrong type of beam screen
- Co-activity in tunnel
  - ……

IC “train” - splice consolidation activities

- e.g. activity “open & close W bellows”
  - For ~ 70-80 IC / week, requires 20 mechanics organised as 7-8 teams working in parallel
    - Cost ~2 500 kCHF



Courtesy T. Renaglia

	Equipment	Point 1 activity [weeks]	Point 5 activity [weeks]	Point 7 activity [weeks]	Point 8 activity [weeks]
BE/APB	survey eqpt.	-	3	-	-
BE/BI	BTV, BLM	-	-	1	-
BE/CO	timing & remote-reset WorldFip	<1 -	<1 1	<1 1	<1 1
DGS/RP	RAMSES	-	-	2	-
EN/EL			**52 (2 shifts)**		
EN/STI	collimat				-
GS/ASE	fi				done -
GS/SE-CE		-	11	-	-
IT/CS	Ethernet	-	2	-	2
TE/MPE	QPS* PIS* current leads heaters BIS WIC	1 <1 6 - -	1 <1 3 <1 -	- - - - -	- - - - 3
TE/VSC	vacuum eqpt	-	-	9	-

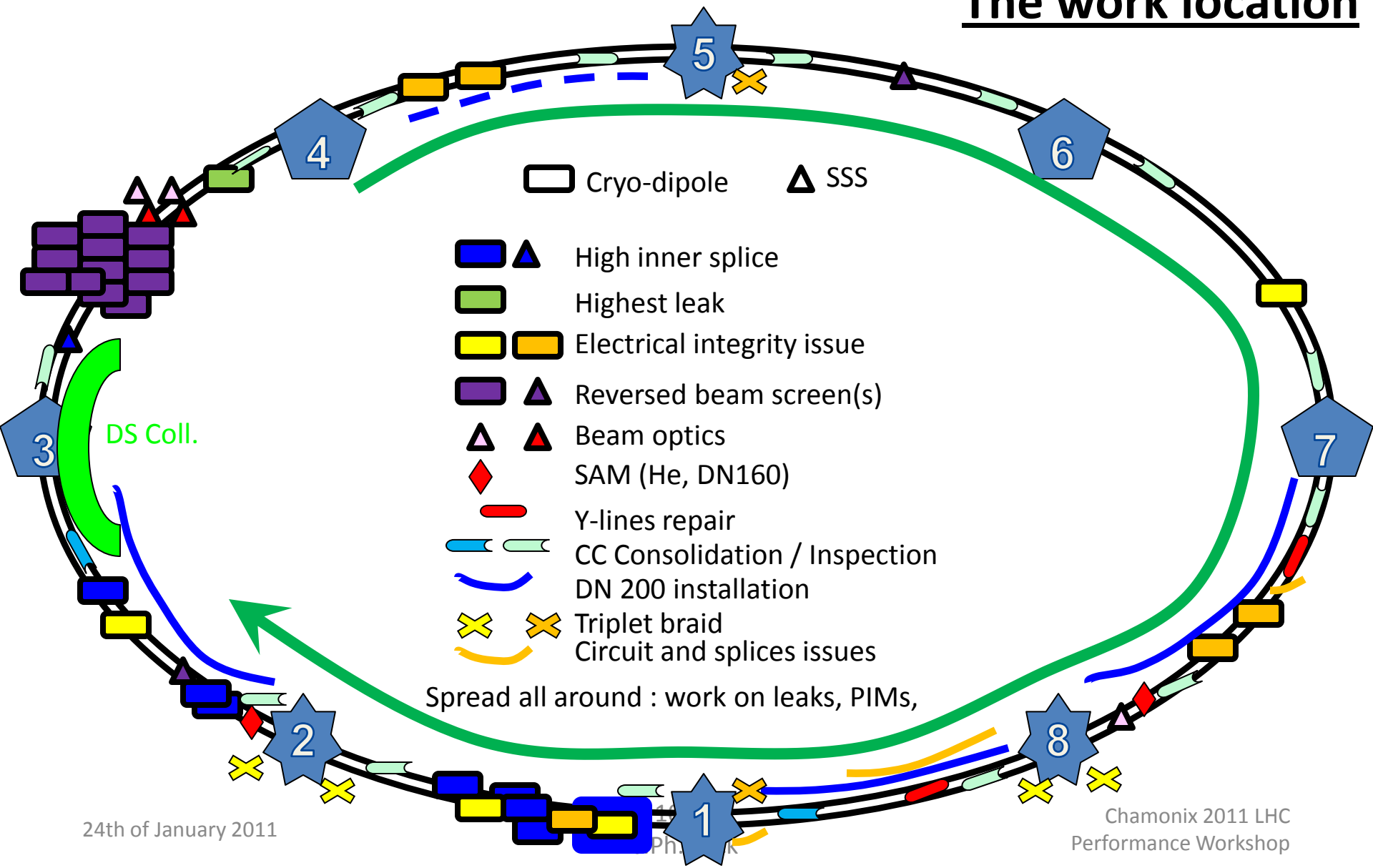
15 groups involved

* re-commissioning during the hardware re-commissioning and powering

Cryomagnets, Interconnections, Superconducting Circuits:

What to do in 2012/13 if you are not consolidating splices ?

The work location



Open issues

- Not planned to replace 12 MB's & 2 SSS in 3-4 with wrong type of beam screen
- Co-activity in tunnel
  - Splice trains will need clear access
  - R2E shielding will block passage for several 1 month periods
  - DN 200 installation (600 units)
  - DS Collimators = 32 cryo assemblies removed modified re-installed
  - 17 other cryo-magnets to be exchanged
- Think long-term
  - Need to consider activities for Shutdowns 1 and 2 together

Conclusions

- When? = 2013
- How long?
  - First estimate → 19 months
  - Next step is to develop a realistic planning
    - Prioritized activities and contingency
    - Available Resources and Manpower (with the required knowledge etc…)
    - Safety and Co-activity issues
    - Using optimized technical solutions
    - …….