CLIC

Compact Linear Collider Study

Meeting Minutes

CLIC CEIS WORKING GROUP

Date and Time:	2017-08-25, from 09:00 to 11:00
Place:	6/2/004
Work package/Domain:	CLIC CEIS Working Group Meeting 5
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Participants

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Links to Indico: https://indico.cern.ch/event/650775/

Contents

1 AGENDA

- 09:00 – 09:20: Meeting begins, John Osborne goes through the minutes from the last meeting and introduces the Agenda for the meeting.
- 09:20 – 10:20: Mauro Nonis presents the CDR baseline and possible modifications and solutions for the Cooling and Ventilation (CV).
- 10:20 – 10:55: Michal Czech presented on the transport requirements for a CLIC Klystron Design and the drive beam building.
- Civil Engineering postponed due to time constraints.

2 PRESENTATIONS

2.1 INTRODUCTION

John Osborne opened the CLIC CEIS working group Meeting 5 at 09:05.

John Osborne went through the minutes from the last meeting, in particular the actions that had been recorded.

Key points:

- Mauro Nonis is still looking for a Fellow or PJAS student to undertake some of the CV tasks.
- Turnaround radii to be defined by A.Latina
- Fire suppression/protection should be investigated.
- A single TBM tunnel is likely to be the most suitable option for a large single tunnel due to space requirements and the ability to utilise the space below the floor level.
- Reduce and group actions together to make the list more manageable.

2.2 COOLING AND VENTILATION INFRASTRUCTURE

Mauro Nonis Presented on the previously proposed Cooling and Ventilation baseline produced for the CDR, and how this baseline has been effected by a re-calculation of the heat loads, particularly those that will be dissipated to air. Following this some solutions were identified which now require further study.

Key points:

- The main change from the CDR proposed as a solution was to decentralise the cooling towers, (originally all located on Prévessin site), to different surface points along the tunnels length.
    - Allows smaller pipe diameters and lower power requirements.
    - Removes the need for booster pipes.
    - Much simpler connection to the drain will be required.
    - Shaft dimensions may be effected where pipes are required for CV, this will need to be included and updated as part of this integration study.
- A discussion was held on the use of the tunnel walls to dissipate some of the heat loading to air. This requires more understanding and is an important effect to understand, potential research to be done into this. See Link for a report produced by J.Osborne and C.Cook.
- Using higher air velocity could cause safety problems by increasing the propagation rate of a potential smoke/gas cloud and therefore trapping person/s trying to escape.
- The cooling tower temperature limit is 27 degrees, otherwise energy would be required to cool the water, and therefore the lowest practical temperature for the modules/machines would have to be 27 degrees.
- For the ventilation of the tunnel the current ducts are not of adequate size and therefore some potential solutions were provided in the presentation:
    - Increase the allowable temperature in the tunnel.
    - Local cooling of the machines.
    - Insulate the modules.
- A meeting is required to discuss the heat loads and the required cooling and ventilation, this should include all users that will be contributing to these heat loads and the CV solutions.
- Speed of people walking and smoke propagation through the tunnel needs to be studied to understand the effect of cooling to air on the safety of person/s trying to escape from the tunnel.

2.3 TRANSPORT UPDATE

Michal Czech gave a presentation on the transport requirements for CLIC, focusing mainly on the new Klystron Design at the challenges that will be faced transporting equipment through the tunnel. Also included in this presentation were the transport requirements for the drive beam surface building.

Key points:

- An evaluation of the requirements for an EOT crane in the drive beam building is required, this will depend on certain factors:
    - **The layout of and the equipment required in the drive beam building.**
    - The cost associated with both options
    - Understanding the frequency of operations in relation to the maintenance requirements and the equipment installation within the building.
- A list of the transportable equipment that dated from 2010 was presented, this list needs to be updated by the parties associated with each item.
- Shaft and lift dimensions should be updated.
- Updated list of the equipment that requires transportation in the Klystron and beam tunnel is required.
- The transport corridor available within the tunnel needs to be looked into to ensure it is adequate for the transportation vehicle and the equipment that is being transported. This will require careful integration and positioning of the services.
- It is imperative that any equipment that is designed or under consideration should also take into account the needs for transportation – this means discussing and liaising with transport during the design process.

2.4 CIVIL ENGINEERIG UPDATE.

Matthew Stuart Unable to present on the Civil Engineering update due to time constraints.

Key points:

- The CLIC Tunnel Optimisation Tool (TOT) wireframes have been designed and are now being produced for testing, this information is included in the presentation and any comments from members of the CEIS WG meeting are welcome and will be relayed back to the contractor producing the tool.
- The updates from this presentation will be given at the next CEIS WG meeting along with any other Civil Engineering updates.

3 TASKS

Tasks are ordered by completion status, new and ongoing tasks first. Status is one of {New, Ongoing, On hold, Completed, Postponed or Cancelled}.

No.	Description and Comments	Start Date	End Date	Status	Assigned
1	**PJAS or Fellow required to take on Cooling and Ventilation integration – Should be available from the summer.**	31/03/2017		Ongoing	M. Nonis
2	**Tunnel Optimisation Tool – Costing and development study.**	31/03/2017	01/10/2017	Ongoing	M.Stuart/ J.Osborne
3	**Turnaround radii may be inadequate, the correct turnaround layout needs to be determined as this ill influence the Civil layout for the higher energy stages.**	31/03/2017	21/07/2017	Ongoing	A.Latina
4	***Machine heat load calculations required to enable HVAC system requirements to be determined.*** **Edit: Update of heat loads is a requirement for the entire CLIC team, heat loading from all equipment should be calculated and sent through to M.Nonis. This will allow discussions/meetings to be undertaken and an appropriate solution to be chosen from those presented by M.Nonis.**	31/03/2017 25/08/2017	25/08/2017 01/12/2017	Completed Update	M.Aicheler CLIC Team
5	**Cooling and ventilation – Presentation to be produced on the current layout for cooling and ventilation, any foreseen changes and any requirements for moving this forward.**	05/05/2017	25/08/2017	Completed	M.Nonis/ Alejandro Mejica

6	**Access requirements during beam operation: it is to be determined when access to the modulators will be required, this will affect the layout and cross section of the tunnel/s. Look at examples from the ILC.**	05/05/2017	01/12/2017	Ongoing	TBC (Raised during C.Rossi presentation)
7	**The main beam dump is to be reinvestigated to ensure the dimensions are adequate.**	16/06/2017		New	A.Yamamoto & M.Calviani
8	**Discuss with Steinar whether or not to initiate informal discussions with the French Power Transmissions System Operator on availability and feasibility of power supply from the existing grid.**	16/06/2017	21/07/2017	Ongoing	S.Stapnes & D.Bozzini
9	**Plan layouts of equipment that is to be provided in the 2.5km long drive beam building is to be produced**	16/06/2017	21/07/2017	New	D.Aguglia & R.Corsini
10	**A solution for the cooling and/or reduction of the heat loads for the CLIC modules needs to be studied and defined before an appropriate ventilation system can be implemented. This could require reducing the amount of heat load to air or by localised cooling. All options to be considered.** ***Edit: See Task 4***	16/06/2017	01/12/2017	Updated – See task 4.	M.Nonis, M.Aicheler & D.Schulte
11	**Transport to give an update and presentation on the current crane solutions and provide alternative options due to the unrealistic method of transporting modules up to 25km along a tunnel by crane.**	16/06/2017	21/07/2017	Completed	I.Ruehl & C.rossi
12	**Services within the Tunnel to be updated in a new cross-section**	16/07/2017	21/07/2017	New	M.Stuart M.Nonis & S.Marsh
13	**Hazard Register and procedure guidelines on how to populate the register to be produced by safety**	21/07/2017	25/08/2017	New	S.Marsh

14	**Electrical Alcove requirements are to be defined for the Klystron design, Civil drawings will then be updated to show this.**	21/07/2017	25/08/2017	New	TBC (CLIC Team)
15	**Continuously update the list of equipment that requires transportation through tunnels shafts and surface buildings.**	21/07/2017	01/12/2017	Ongpoing	M.Czech
16	**Service requirements for the klystron design to be collated by Civil Engineering.**	21/07/2017	13/10/2017	New	SMB: M.Stuart & R.Fernandez
17	**Safety: propagation of smoke/gas cloud against escape time from the tunnel to be studied by safety. Look at examples from FCC.**	25/08/2017	01/12/2017	New	S.Marsh
18	**Transport: Continuously update the list of equipment including dimensions and weights, this is to be sent to transport as soon as available.**	25/08/2017	01/12/2017	New	CLIC Team

4 NEWS

No other news.

5 AOB

- A safety contact for ILC should be identified to allow collaboration on safety elements of both CLIC and ILC.

6 PLANNED MEETINGS

This section contains planned meetings.

Title	Date	Location	Convener
CLIC Civil Engineering & Infrastructure Working Group Meeting	13th October 2017	6/2/004	J.Osborne
CLIC Civil Engineering & Infrastructure Working Group Meeting	01st December 2017	6/2/004	J.Osborne
CLIC Civil Engineering & Infrastructure Working Group Meeting	26th January 2017	6/2/004	J.Osborne
CLIC Civil Engineering & Infrastructure Working Group Meeting	09th March 2017	6/2/004	J.Osborne

CLIC Civil Engineering & Infrastructure Working Group Meeting	06th April 2017	6/2/004	J.Osborne
CLIC Civil Engineering & Infrastructure Working Group Meeting	11th May 2017	6/2/004	J.Osborne
CLIC Civil Engineering & Infrastructure Working Group Meeting	15th June 2017	6/2/004	J.Osborne

6.1 TENTATIVE AGENDA FOR NEXT MEETING: 25TH AUGUST 2017

- Update on the transport requirements for the drive beam design. – **I.Ruehl & M.Czech**
- Heat Loading: This is a requirement for the entire CLIC team, heat loading from all equipment should be calculated and sent through to M.Nonis. This will allow discussions to be undertaken and an appropriate solution to be chosen from those presented by M.Nonis.
- Civil Engineering Update – **M.Stuart**

Note: Formal agenda to follow once finalised.