

High
Luminosity
LHC

HL-LHC: MEASUREMENTS FOR POSSIBLE VIBRATION ISSUES INDUCED BY CE

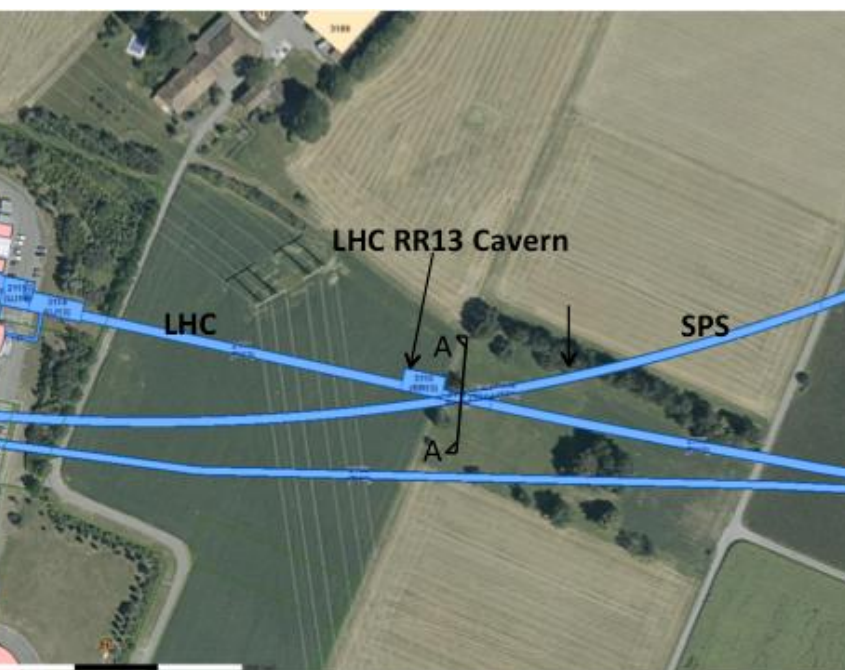
Presented by P. Fessia



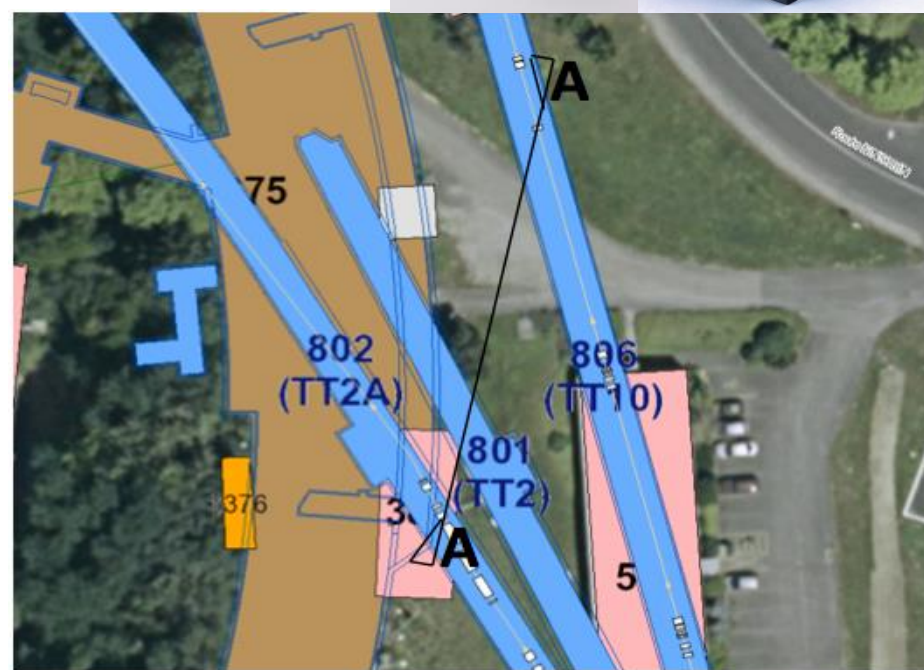
The HiLumi LHC Design Study is included in the High Luminosity LHC project and is partly funded by the European Commission within the Framework Programme 7 Capacities Specific Programme, Grant Agreement 284404.



Floor transfer function: initial ideas



SPS / LHC tunnels

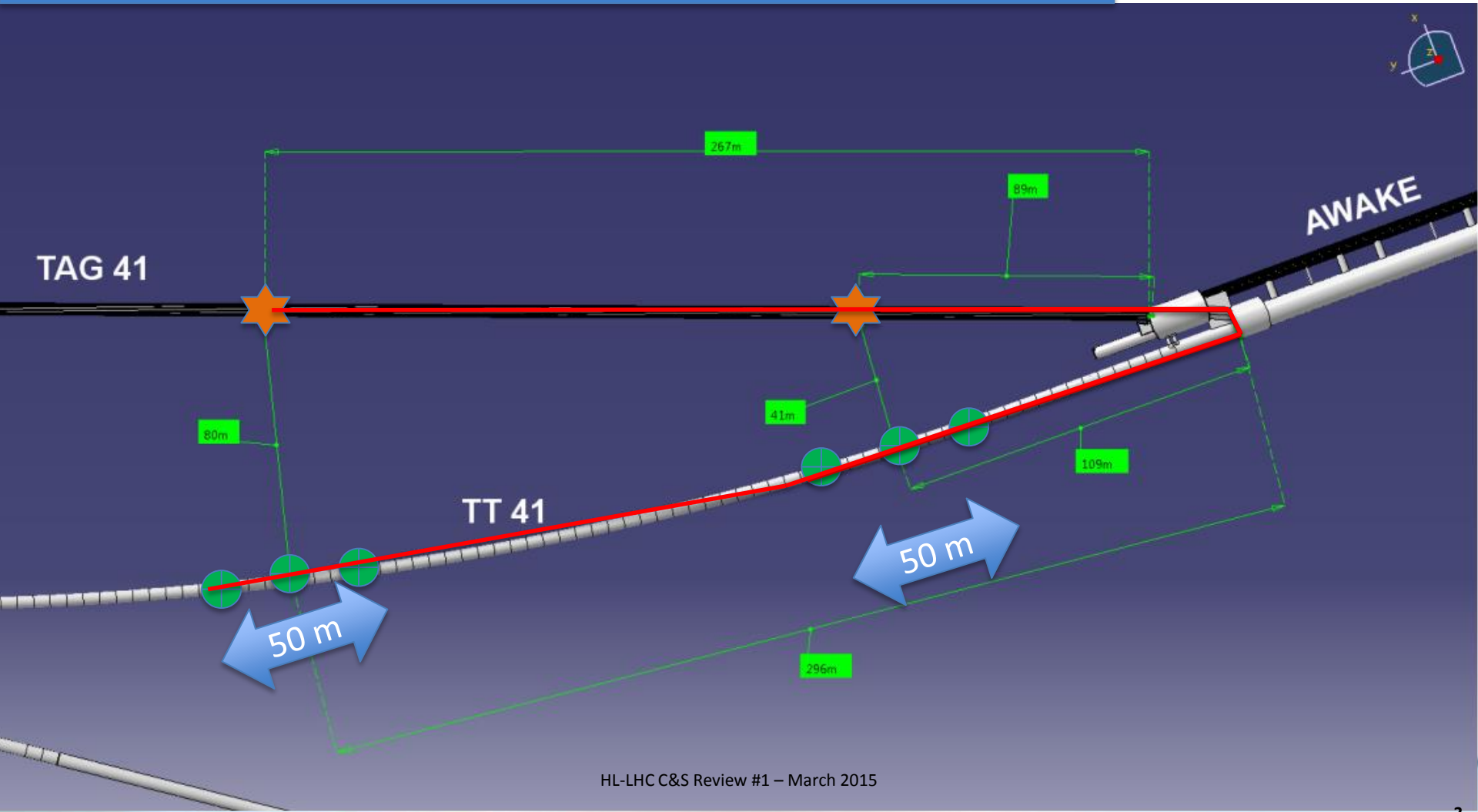


Injection tunnels (TT2->TT10)

Present proposal for measurement locations in TAG41-TT41 approved by AWAKE and IEFC



Important remark: we have the good proper rock type here



Present proposal for measurement locations in TAG41-TT41

- Time required
 - Tunnel set up 1 day
 - Measurement 1 night
 - Disassembly 1 day

Present planning
28th /04/2015 inspection of the site
5th and 6th May measurement
7th May reserve day

Co-habitation

According to our understanding

- 1) No impact on AWAKE activities at all till 10/05
- 2) After 10/05 feasible but there will be transport of material dismantled by EN-CV through the TAG41. We would like to do it before

We need external company intervention to

Provide the shaker (coming from Zurich)

Operate the shaker

Provide expertise in this type of measurement

Providing them access can be the showstoppers.

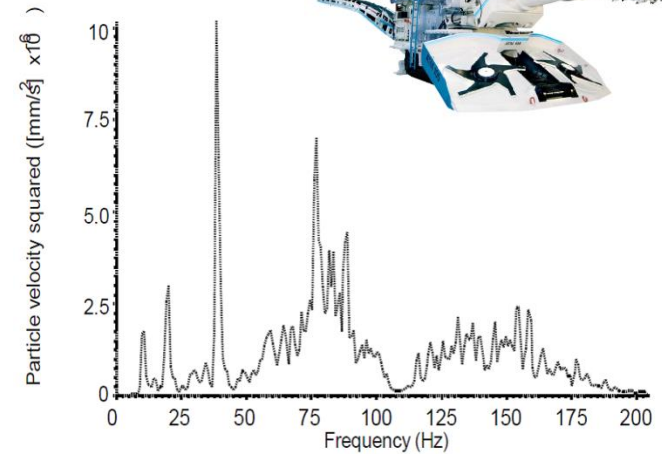
We are working on this (T. Otto)

not solved yet, but fruitful discussion ongoing



Test plan. Preliminary

- Frequencies
 - Scan range from few Hz to 200 Hz
- Amplitude
 - if possible get to oscillation of $\pm 4\text{-}5\ \mu\text{m}$ in the target area. (to be seen probably not enough power)
- Modus operandi
 - Geophones in the target area, scan frequencies at low amplitude and then increase of amplitude. Install a geophone on one of the magnet (not aligned, not connected) in the TT41 to verify any unexpected resonances
 - Verify coherence along tunnel length (multiple target measurement points) and attenuation in function of rock thickness (two location at 40 and 80 m)



Status of discussions and access

- Program submitted and discussed on the 23/04/2015 at the AWAKE integration and coordination meeting: result go ahead. Proposal to have geophone on magnet integrated in plan
- Technical visit of RESONANCE on the 28th/04: all access cleared up
- Access for intervention of RESONANCE
 - 28th/04: in addition to general safety they will go through standard safety training and self rescue mask training (thanks to EN-MEF and all parties involved)
 - Electrical awareness: agreement reached between DGS-SEE (J. Gascon) and TE-DSO (T. Otto) with the following scheme
 - The workers from the external company do not touch any electrical installation of CERN, they only operate their own material (the shaker)
 - In TAG 41, only electrically isolated equipment is installed, without particular electrical hazards.
 - The workers of the external company receive a safety briefing at the beginning of their intervention, giving them, among others, guidelines on electrical safety.
 - Safety briefing should include hazards and risks in the area, PPEs to carry, how to use particular CERN PPEs (mask).
 - They are escorted by CERN personnel during the whole intervention.
 - The CERN personnel shall be in possession of a valid H0/B0 certificate and if possible having a good knowledge of the electrical installations in the area.
 - For dosimetry the following procedure has been agreed between T. Otto and DGS-RP (information from RP indicates that TT41 is close to the background and ($<0.1 \mu\text{Sv/h}$) in term of dose rate and TAG41 in the background).
 - The workers complete the e-learning on radiation protection for supervised areas.
 - They receive a safety briefing, which will also contain key messages on radiation protection.
 - If deemed necessary, the workers are equipped with CERN personal dosimeters for the duration of their intervention.
 - The workers are escorted at all times during their work, the escorts wear their personal dosimeters.

Other tests

- Set up a present triplet string. Use:
 - Test e-cloud coating procedures
 - Test disassembly procedure
 - Develop new alignment system
 - Perform other vibrational measurement if needed.