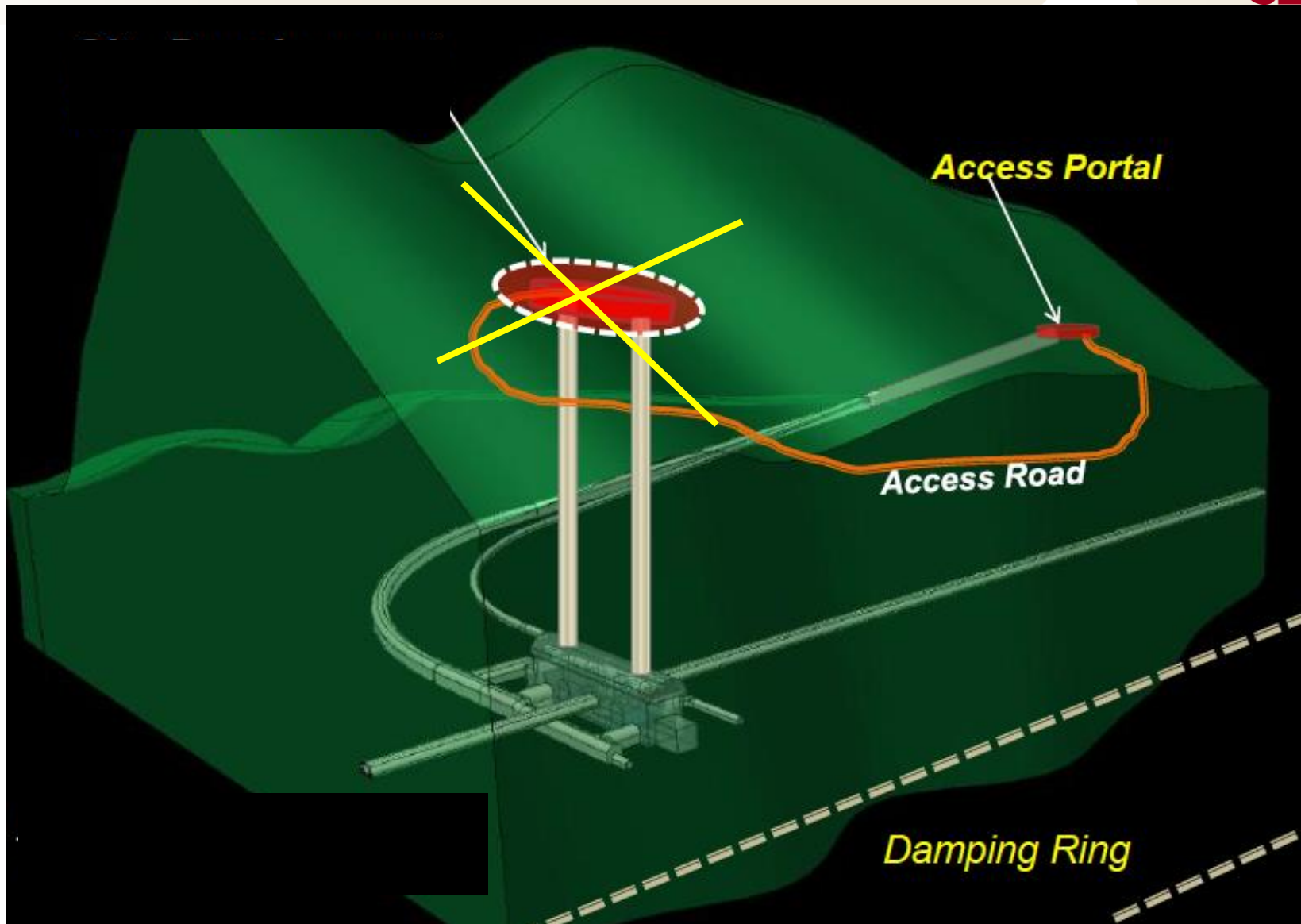


Access Yard Assembly

Marco Oriunno (SLAC), November 13, 2013
LCWS13, TOKYO

Japanese ILC Site – Horizontal Tunnel Access



Several location options for of the Access Yard, how to select them :

1. Ideally a Short tunnel length and a low slope, but most likely a compromise of the two features.
2. How much does the Detector Access Yard share with the installation and maintenance of the CFS around the IP ? A seprate Access Yard for the machine ?
3. Proximity to Freeways and Rail rated for heavy loads transport
4. Assuming that the same developed area for all the options is available
5. Costs.

ILC needs to have “Lean” Detectors

Toyota Factories pioneered Lean Assembly :

“preserving value with less work”

Fight The Seven Muda (futilities)

Transportation, Inventory, Motion, Waiting, Over-processing, Over-production, Defects.

Big Detectors for Big Science must be Lean :

Time vs labor (Costs)

Time vs Technology drive (Increasing Performances)

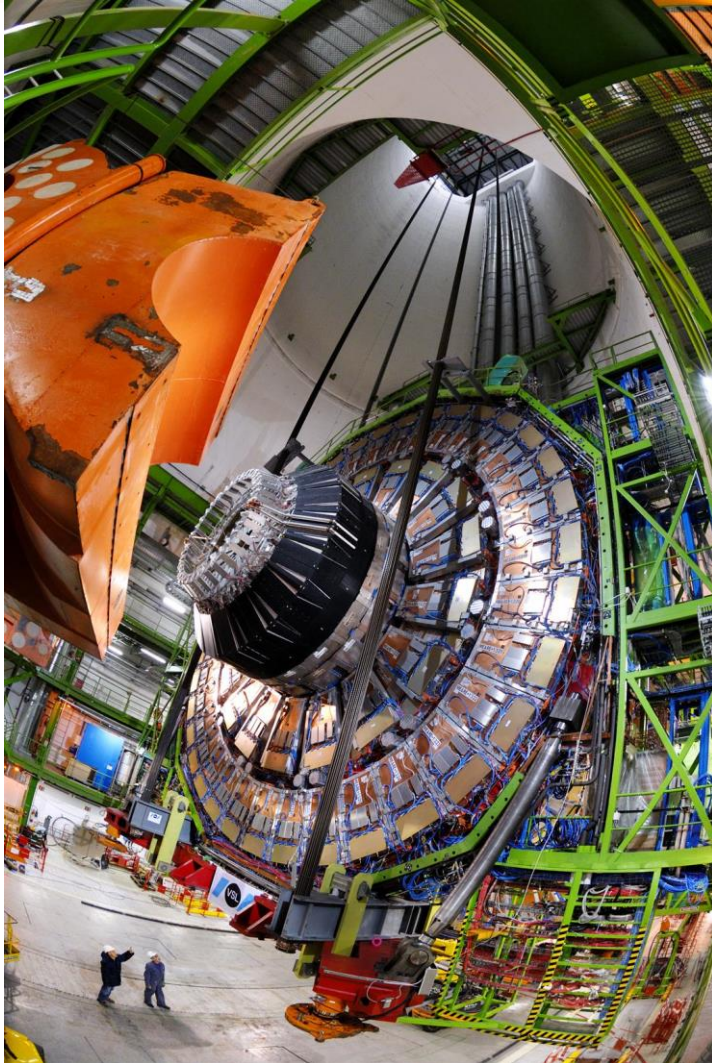
Low Maintenance (Costs)

High Upgradability (Costs and Scientific reach)

Shorter commissioning to get nominal performances

International Competition

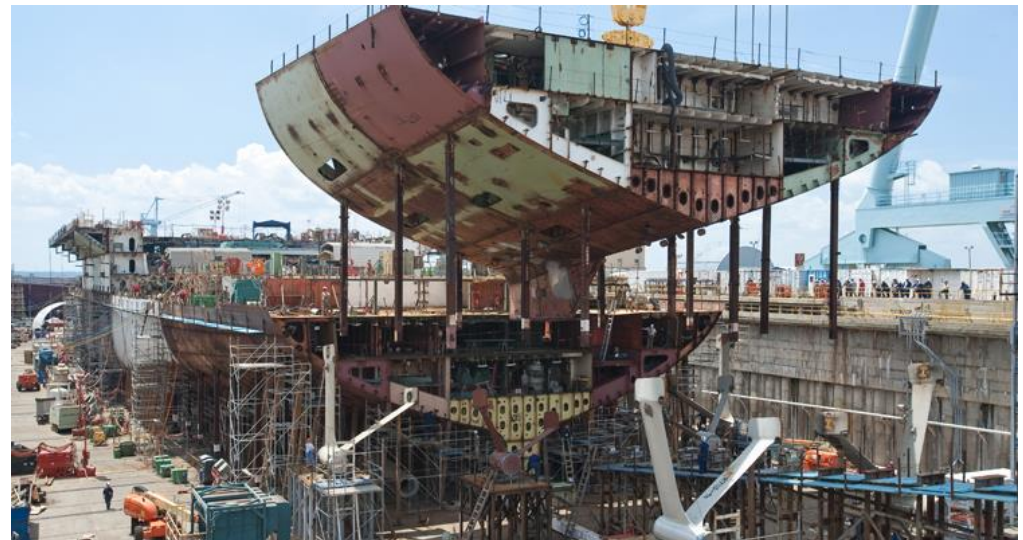
Lean assembly – Some Examples



CMS Detector



Airbus



Shipbuilding

Detector Hall Requirements – The War of Resources

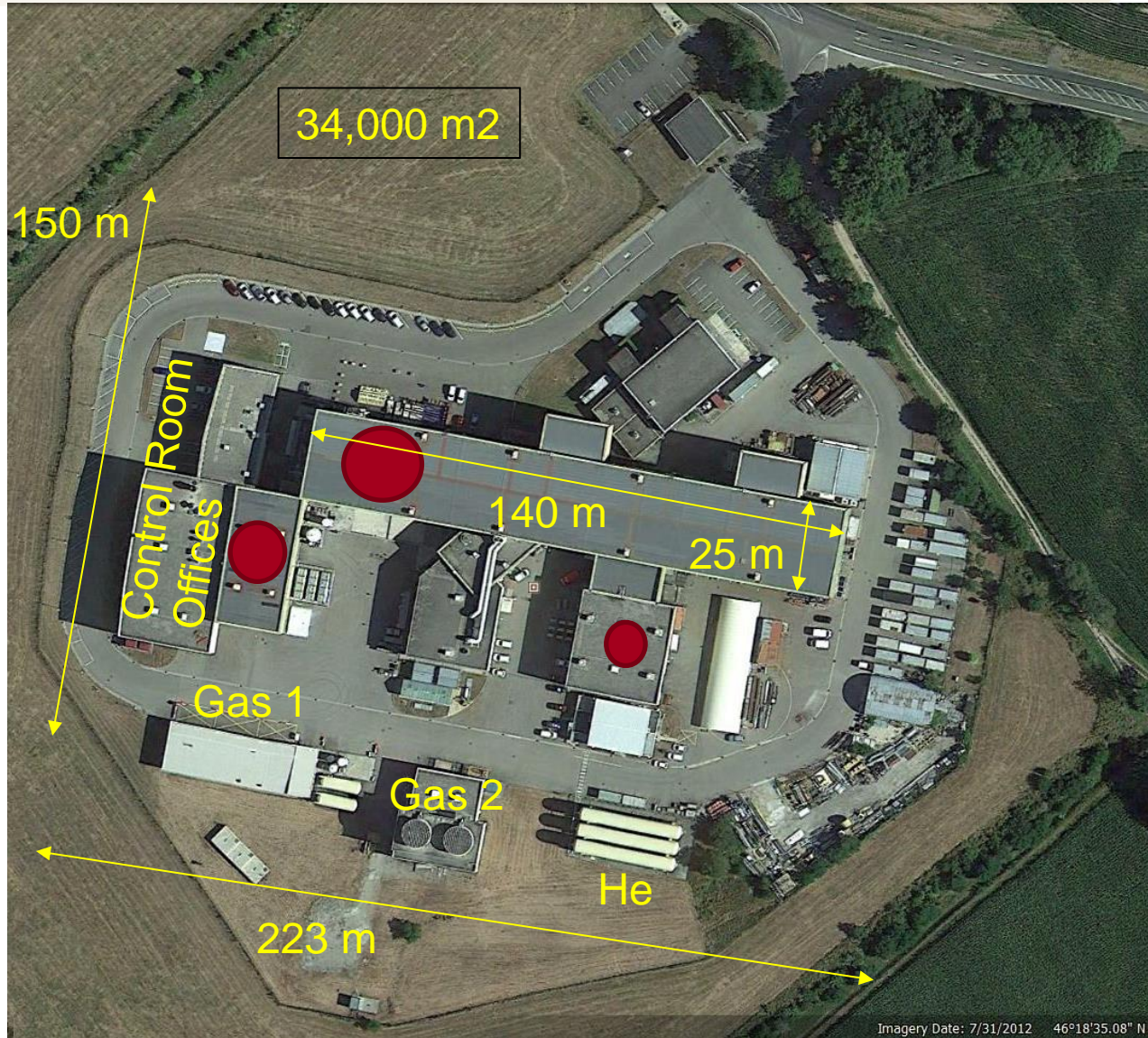
Two detectors in one experimental hall must share a lot of infrastructures even more than beam time.

1. Single Horizontal tunnel : Minimize by design the risk of logjam
2. Single 200t+ bridge crane : strict planning of the heavy lifts
3. Unfriendly environment
4. Safety of the personnel

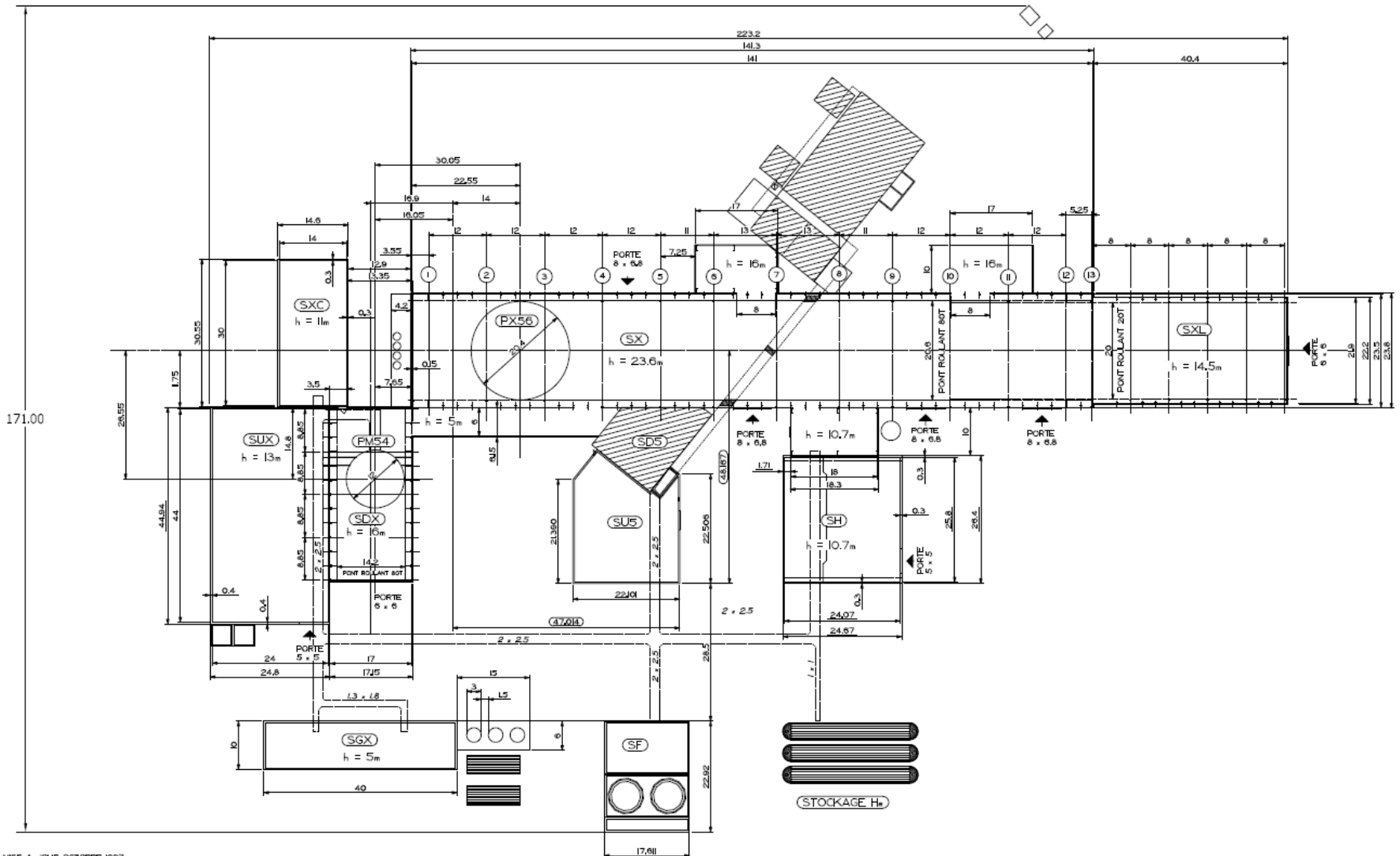
...Planning tasks on surface As Many As Reasonable Achievable : A.M.A.R.A.

...Decoupling detector assembly from Experimental Hall construction

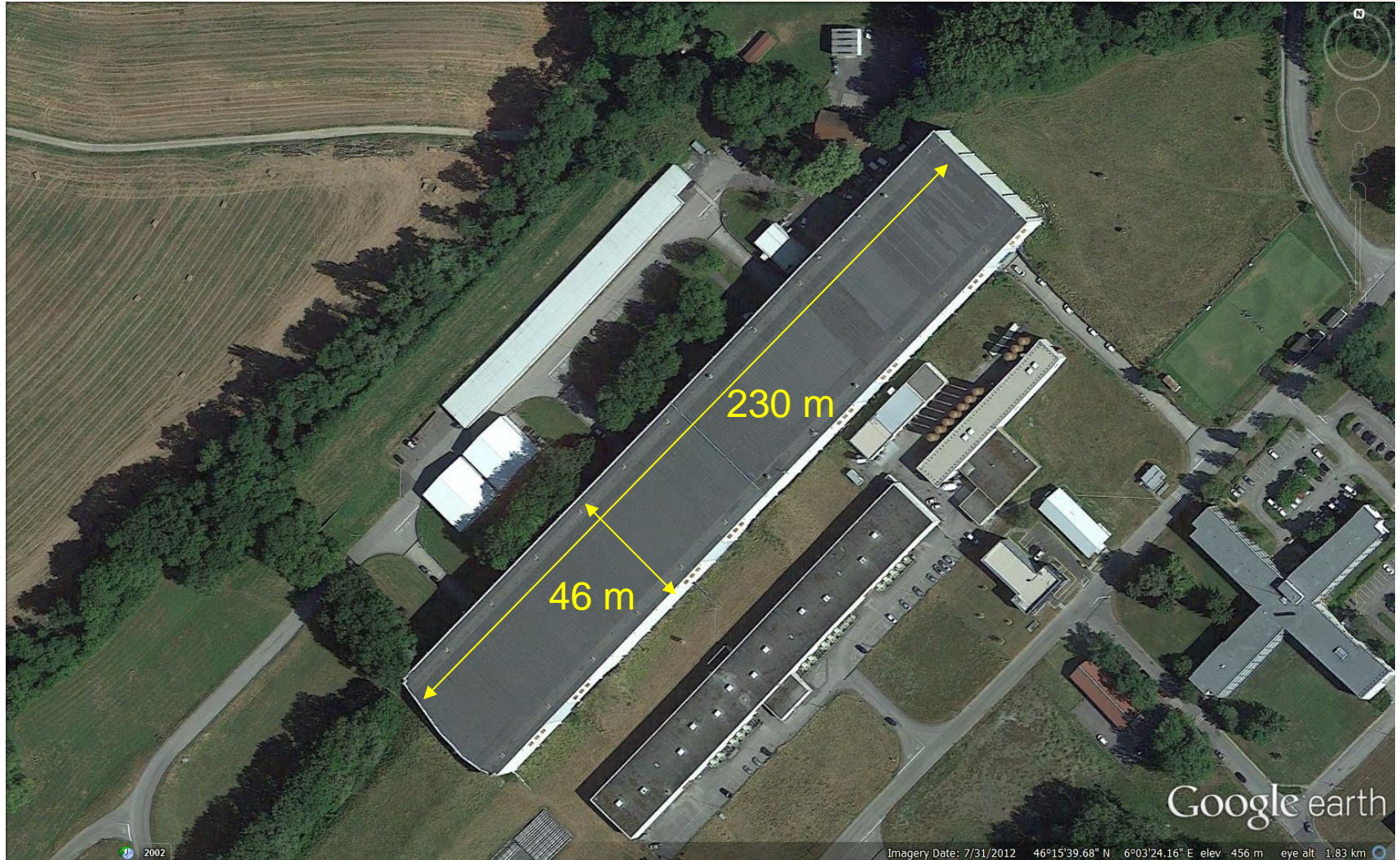
Assembly Yard - CMS



Assembly Yard - CMS

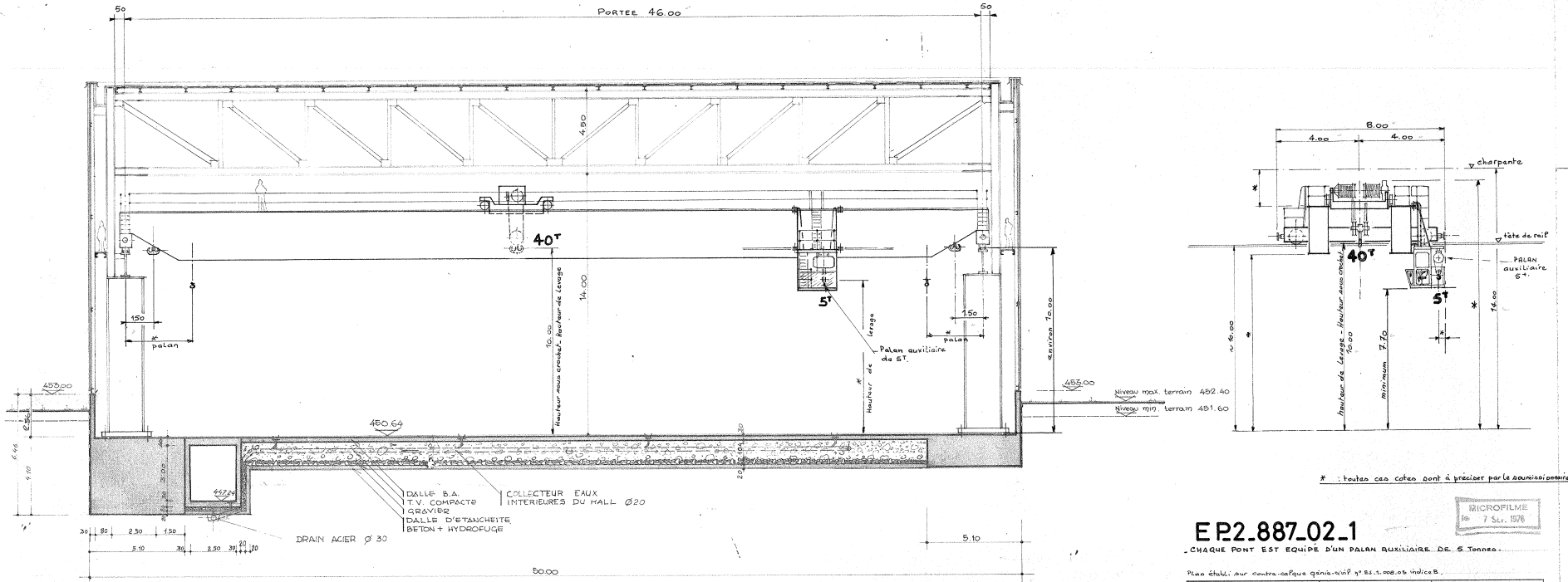


SPS beam extraction - North area (CERN)



SPS beam extraction - North area (CERN)

SLAC



4607049

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E P2.887.02_1

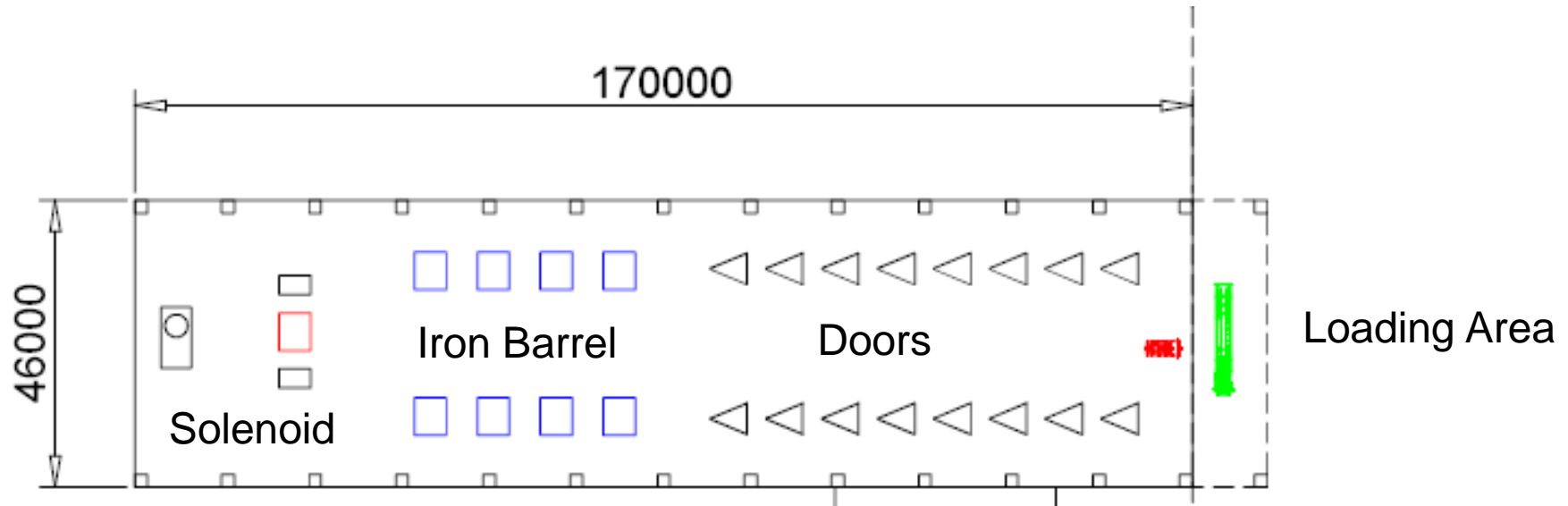
MICROFILME
No. 7 Ser. 1976

CHARGE PONT EST EQUIPE D'UN PALAN AUXILIAIRE DE 5 TONNES.

Plan établi sur contre-croquis géométrique n° 85.1.005.05 indice B.

SB		ECHELLE 1/100	
LABO II - ZONE NORD.		15/1/74 CAS	
HALL EHN 1 - COUPE.		35.07.74 CA-2	
PONTS-ROULANTS 40/46m.			
CERN		E P2.887.02_1	

Detector Assembly Hall



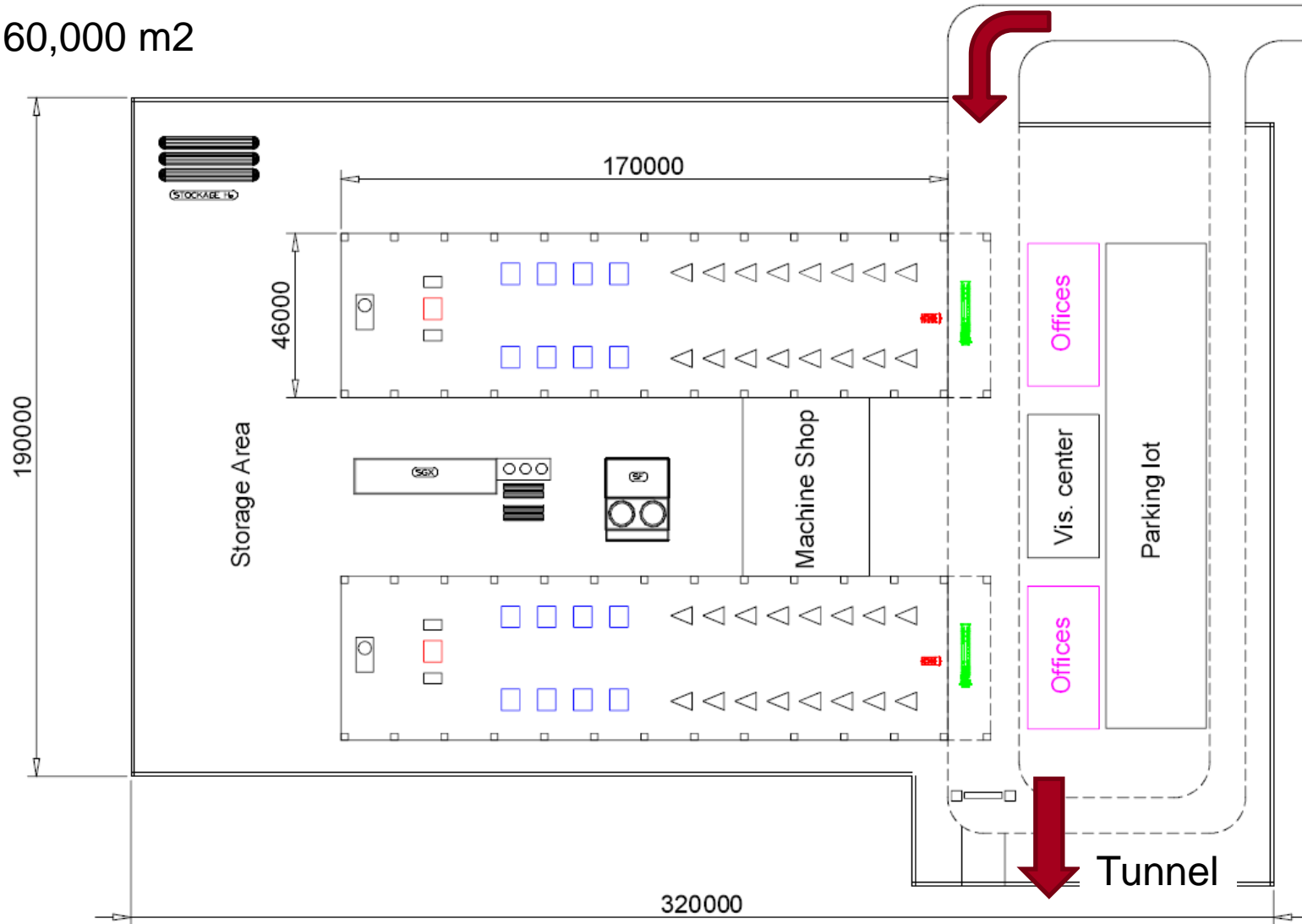
One bridge crane ~ 30t

Ground motion with pushback trucks

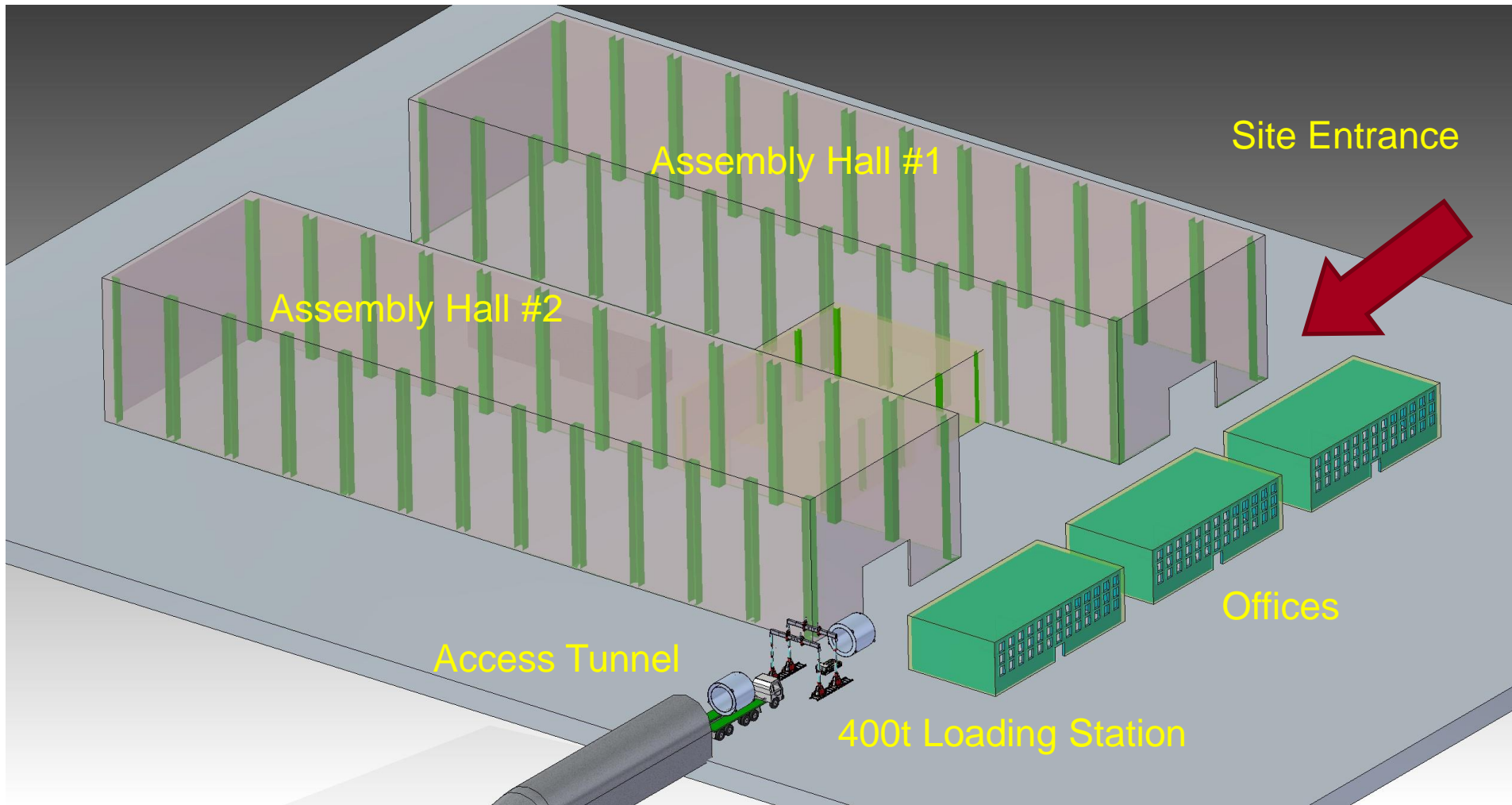
Detector units loaded with sensors, tested and pre-commissioned

Kitakami Access Yard

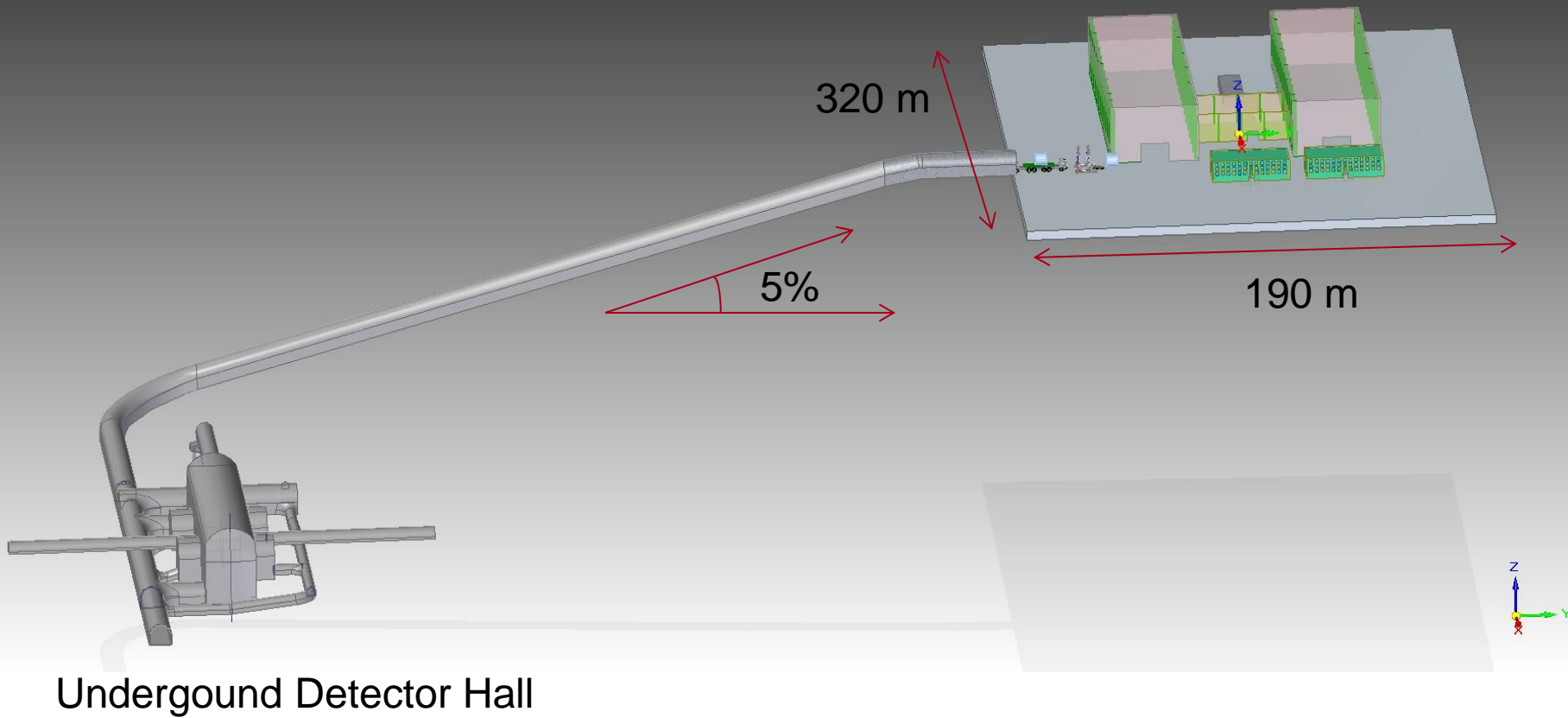
60,000 m²



Access Yard Buildings

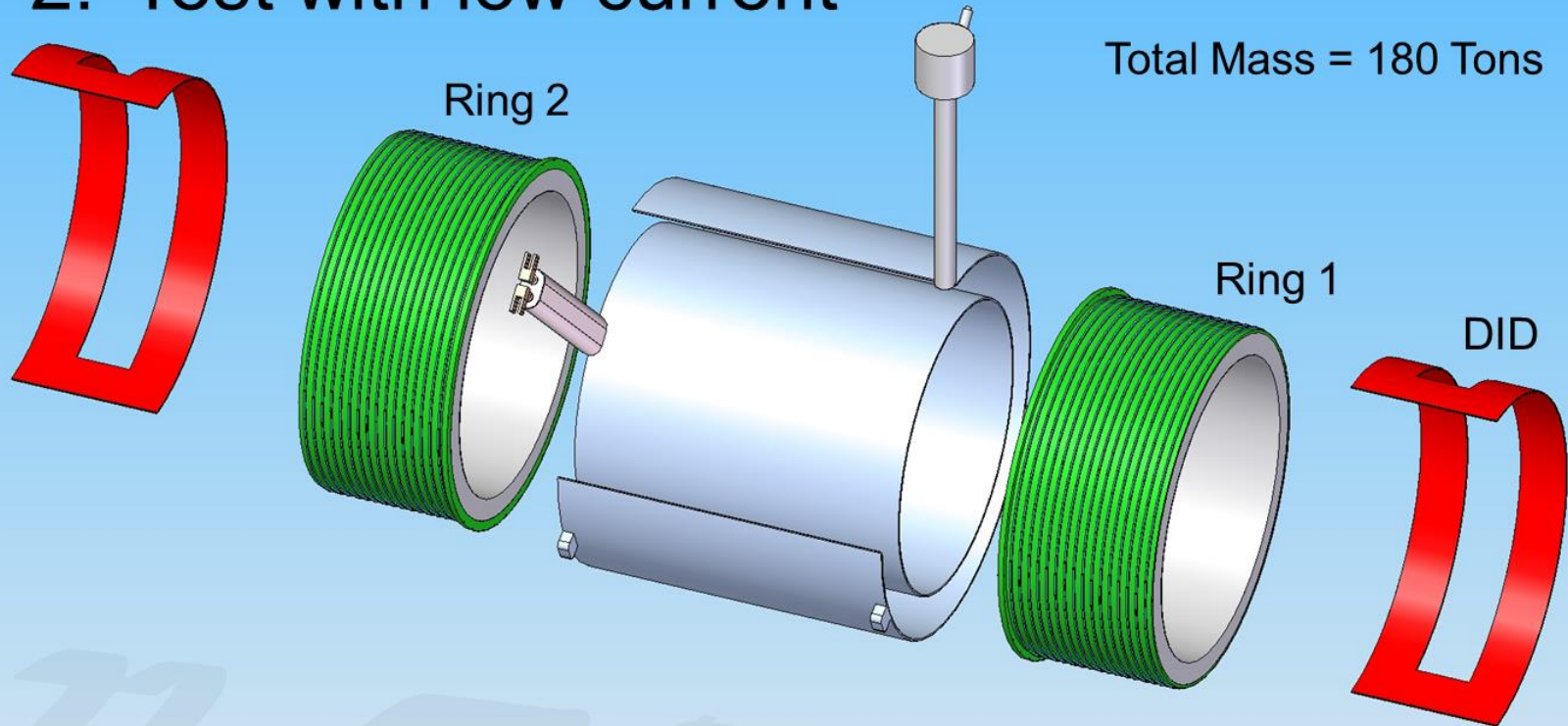


Kitakami Access Yard



Solenoid Assembly and Commissioning

1. Assembly on Site (surface)
2. Test with low current

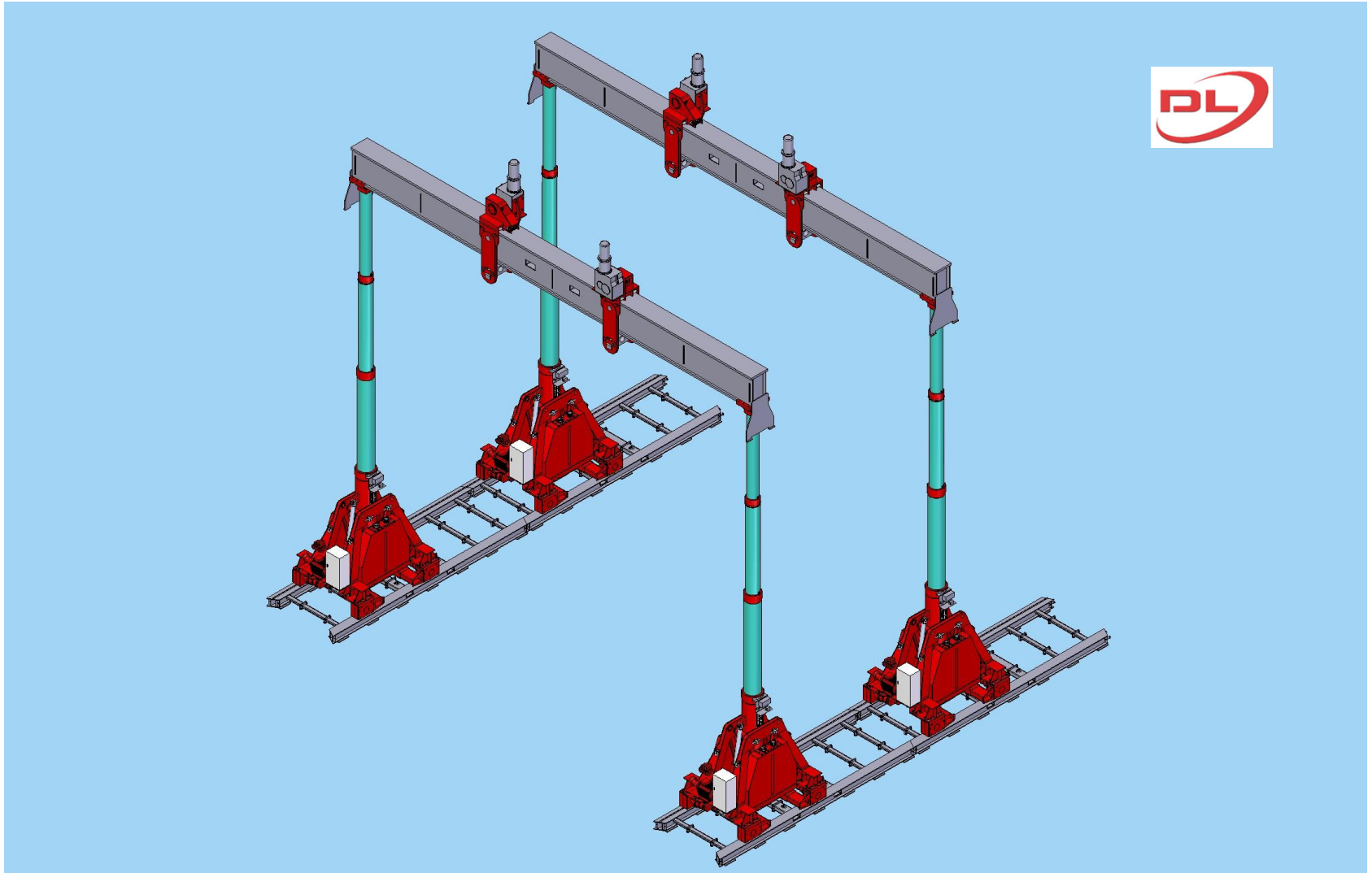


Detector Units on cart + Pushback track

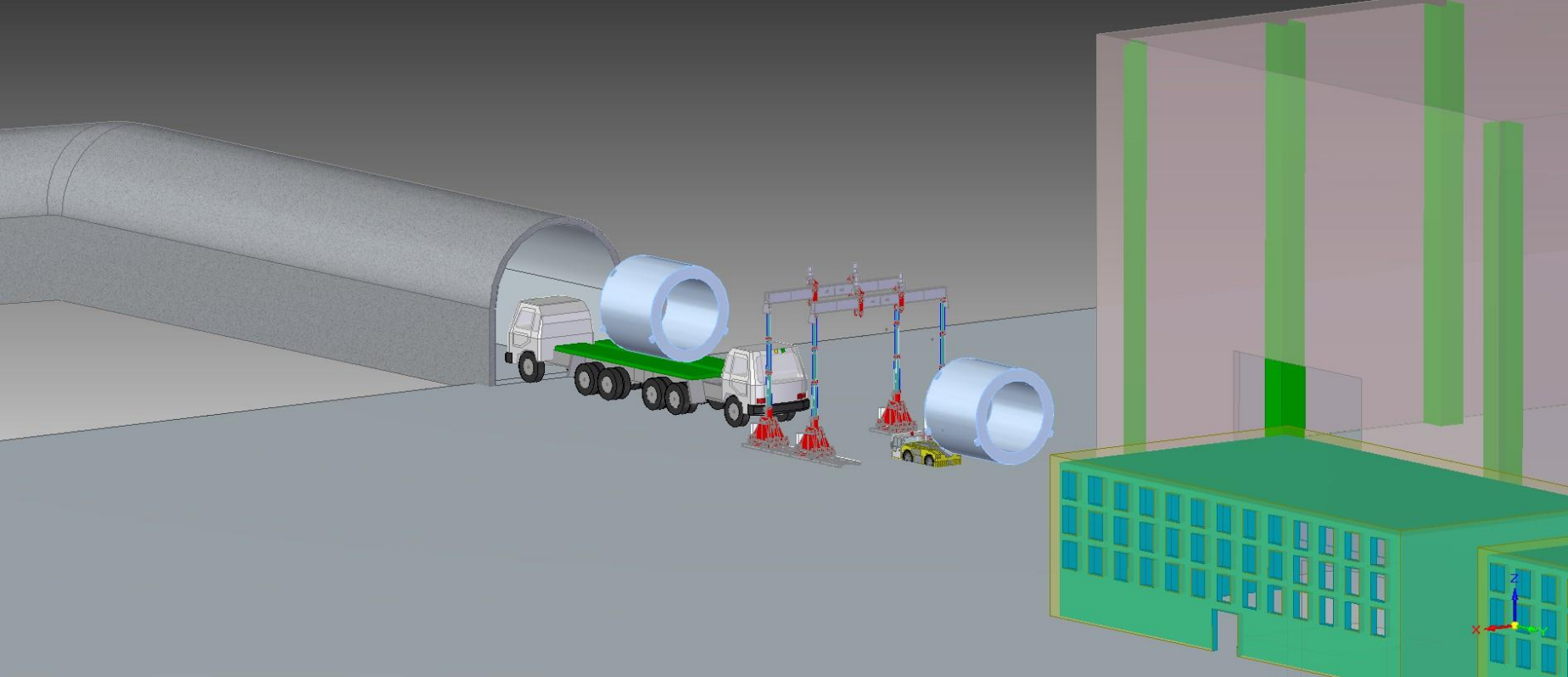


DCL-TLG100 Moving Crane – 400 T

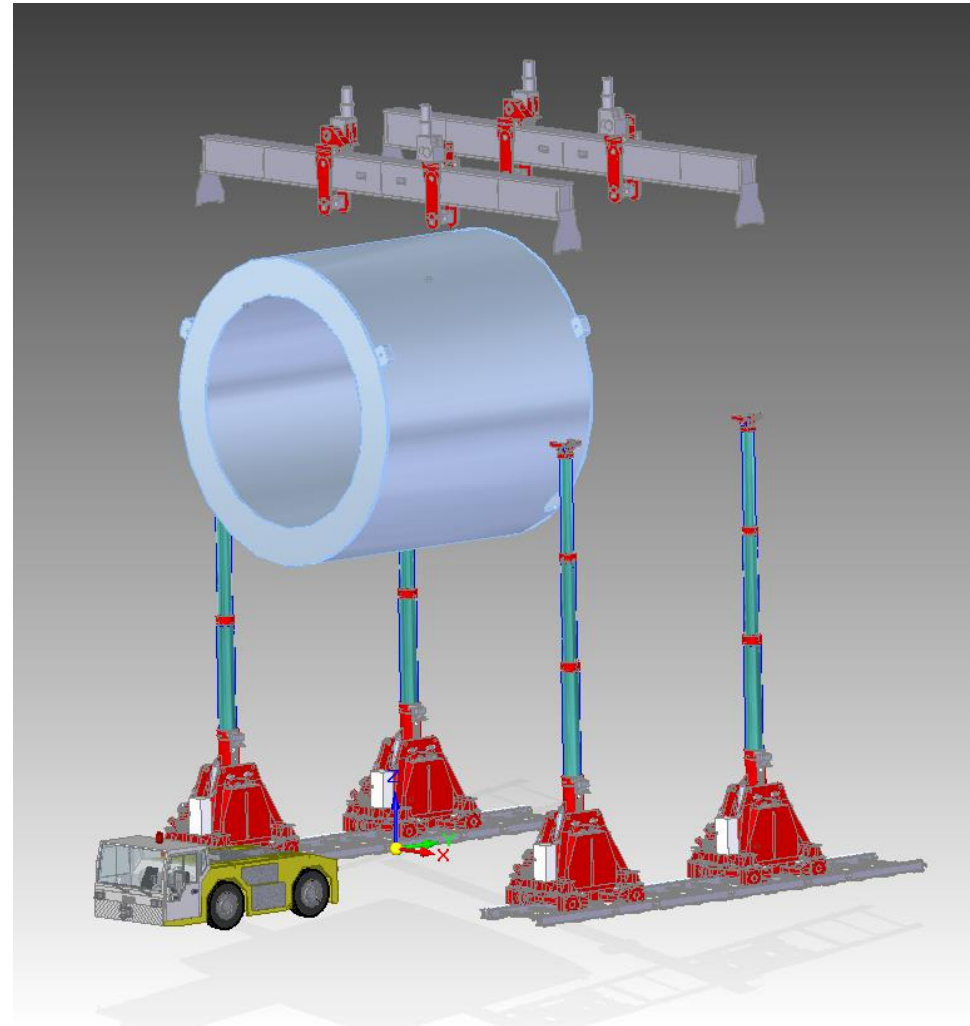
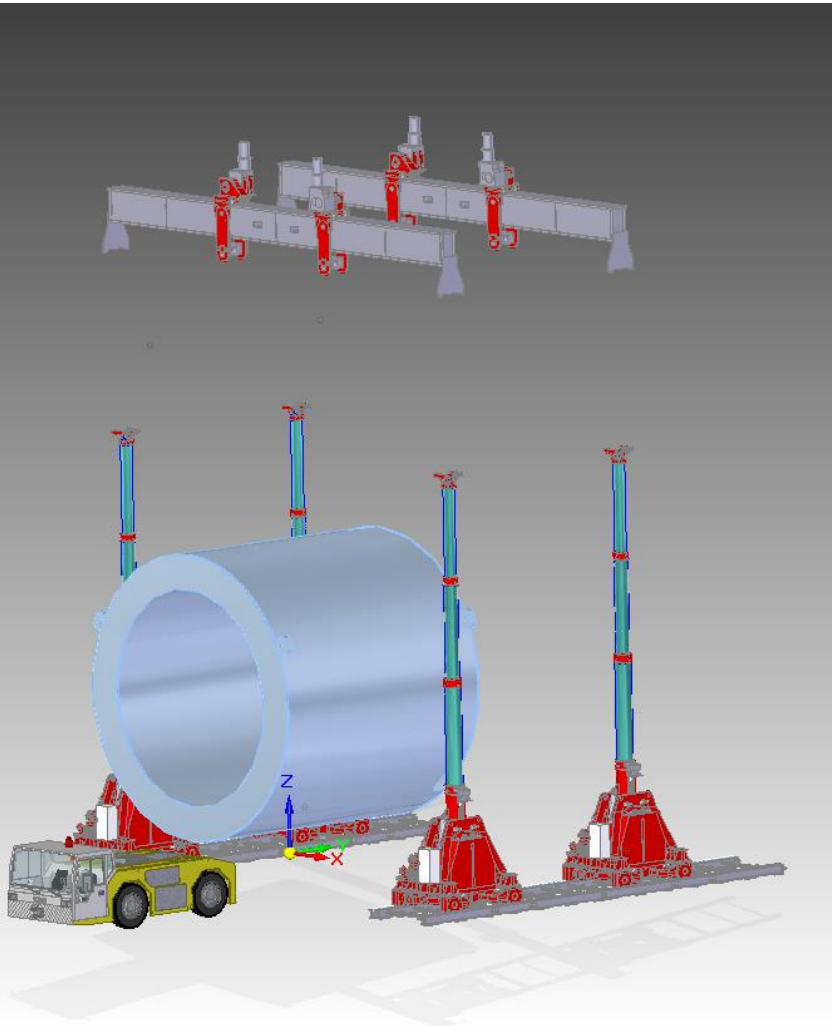
SLAC



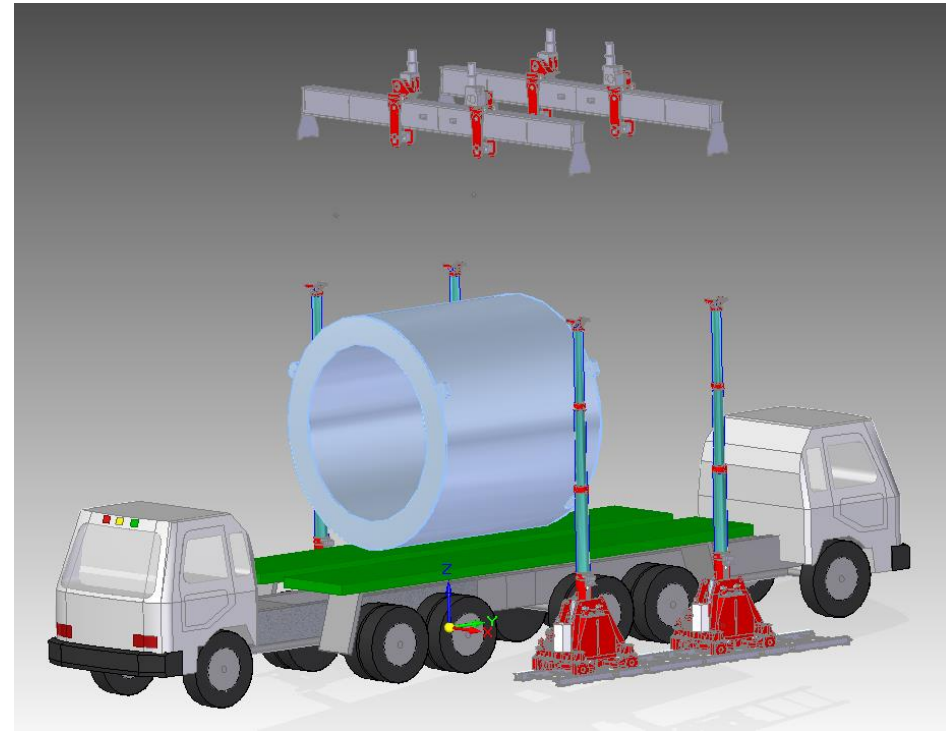
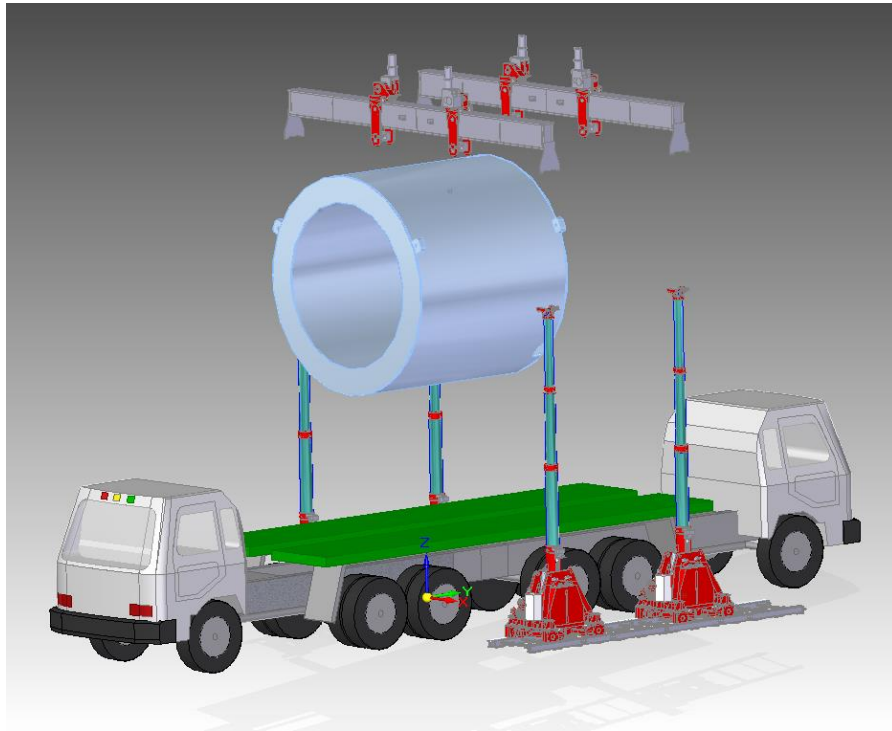
Transferring parts underground



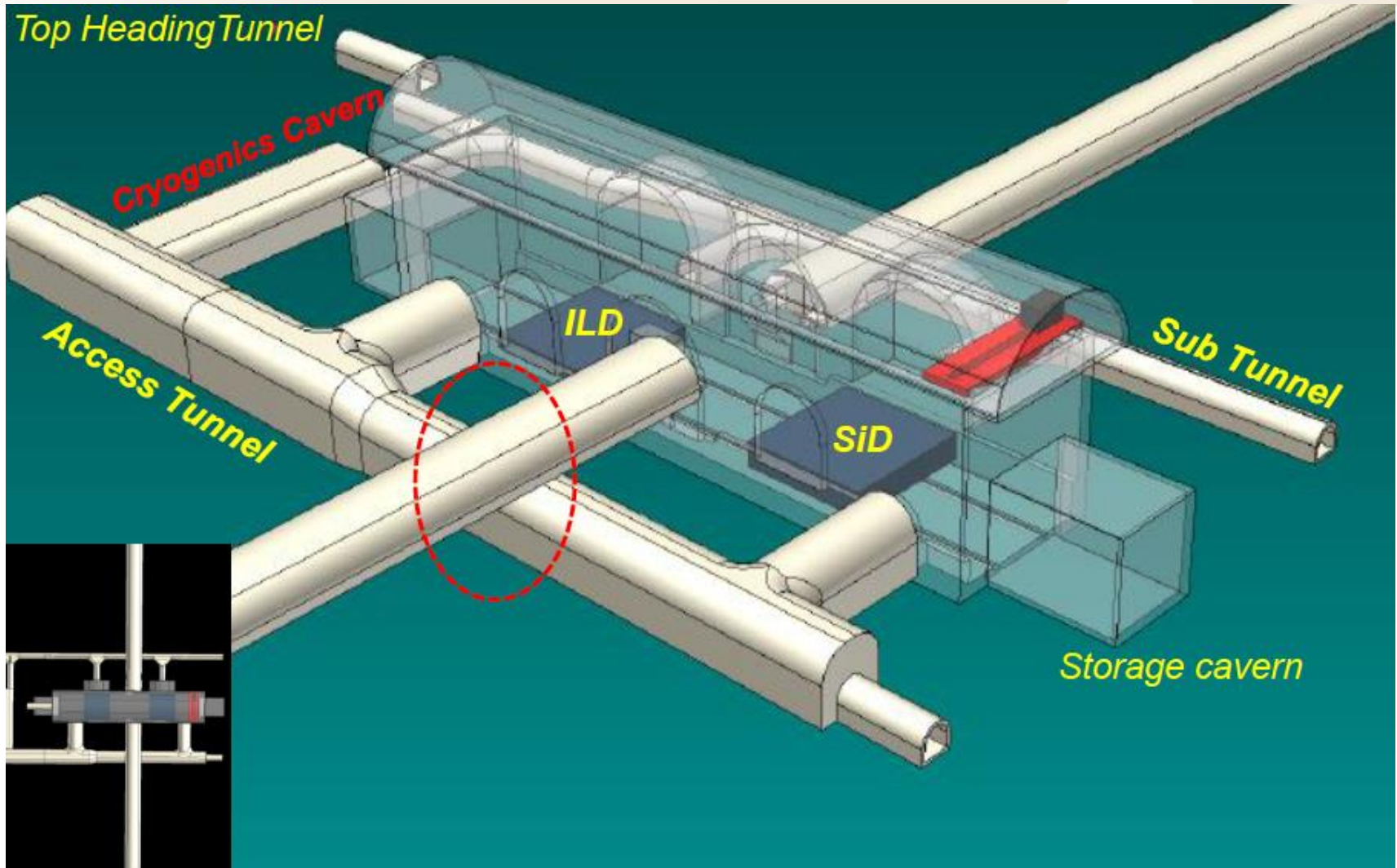
Loading station 400 tons



Loading station 400 tons



Detector Hall



Magnet Installation – Japanese Site

