

Installation of Crab cavity

KEK M. Ono

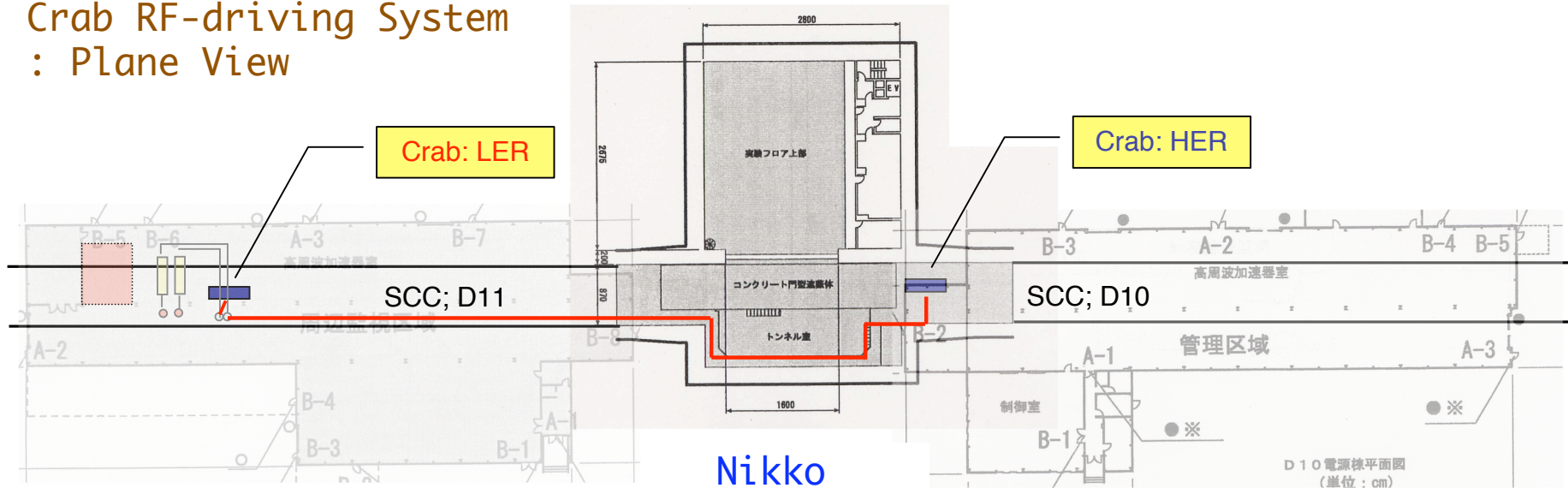
07/March

Present Status of Tunnel
; Nikko Straight Section

Installation Procedure

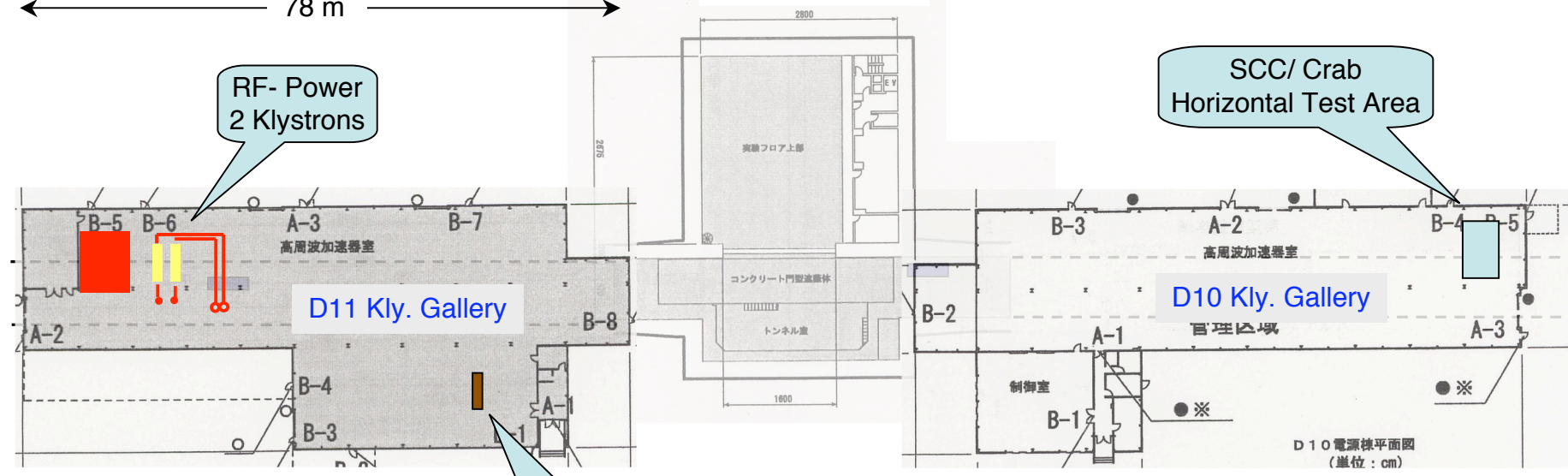
Schedule: Past/Future

Crab RF-driving System : Plane View



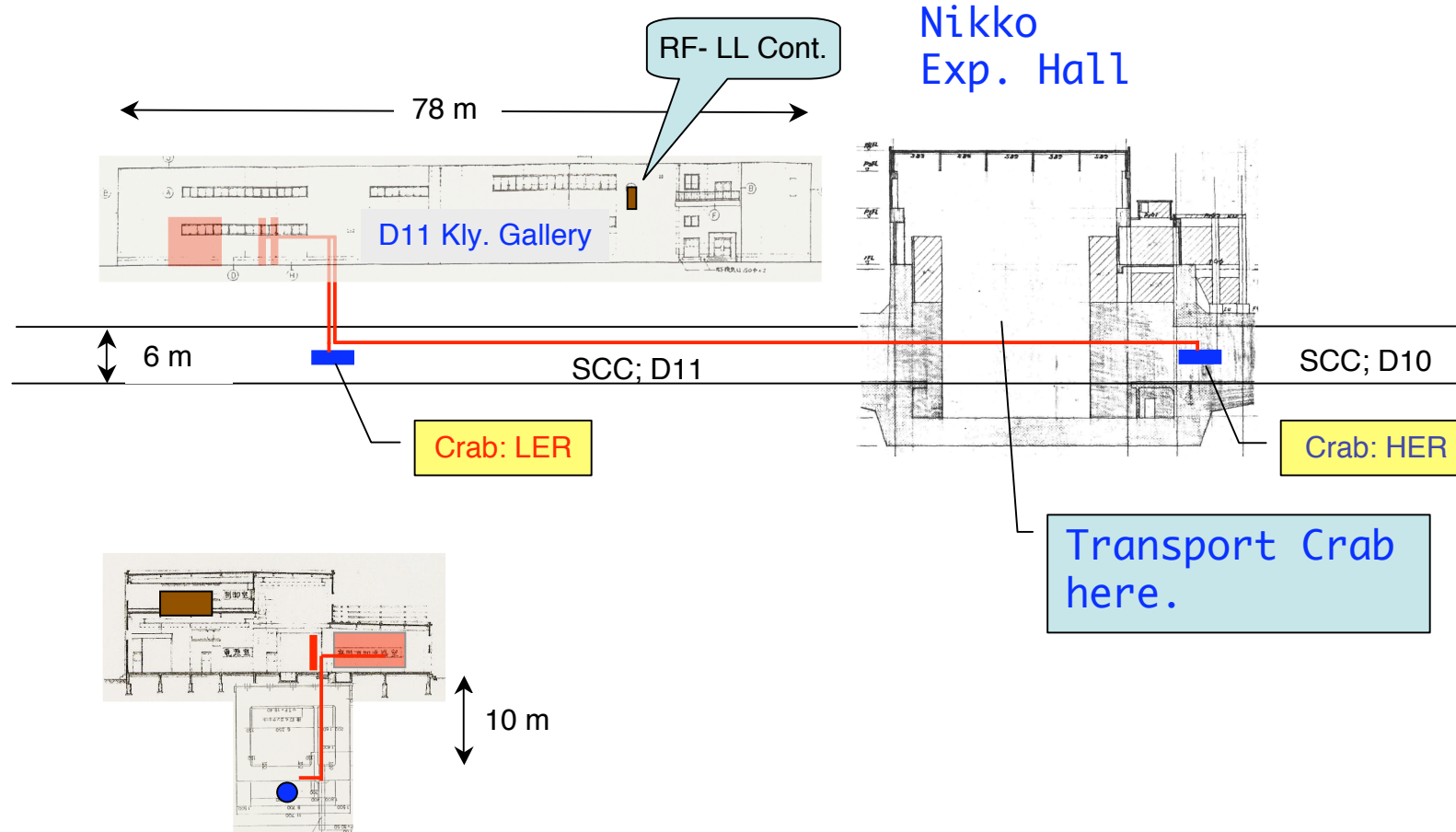
Nikko
Exp. Hall

78 m

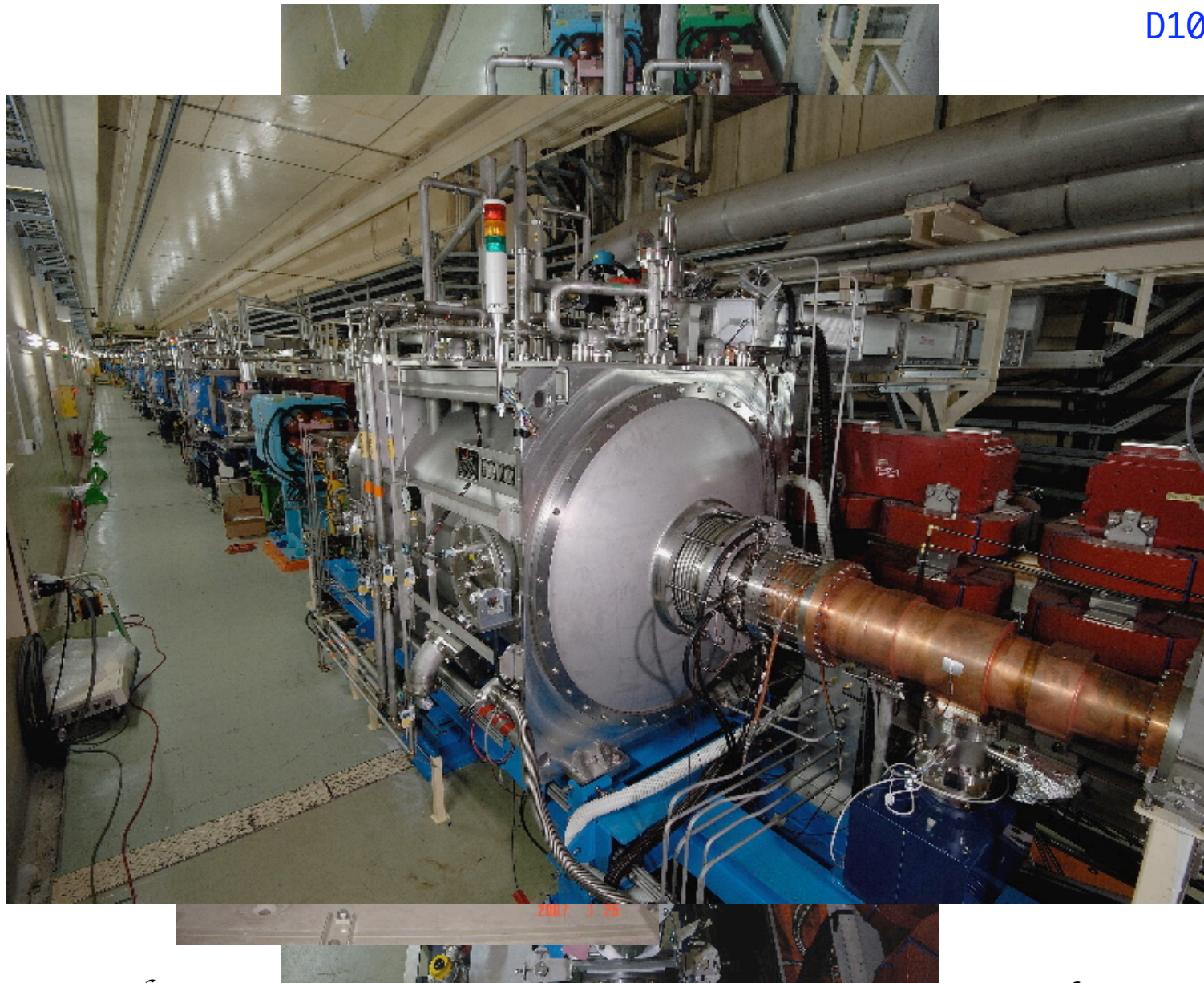


RF- LL Cont.

Crab RF-driving System : Side View

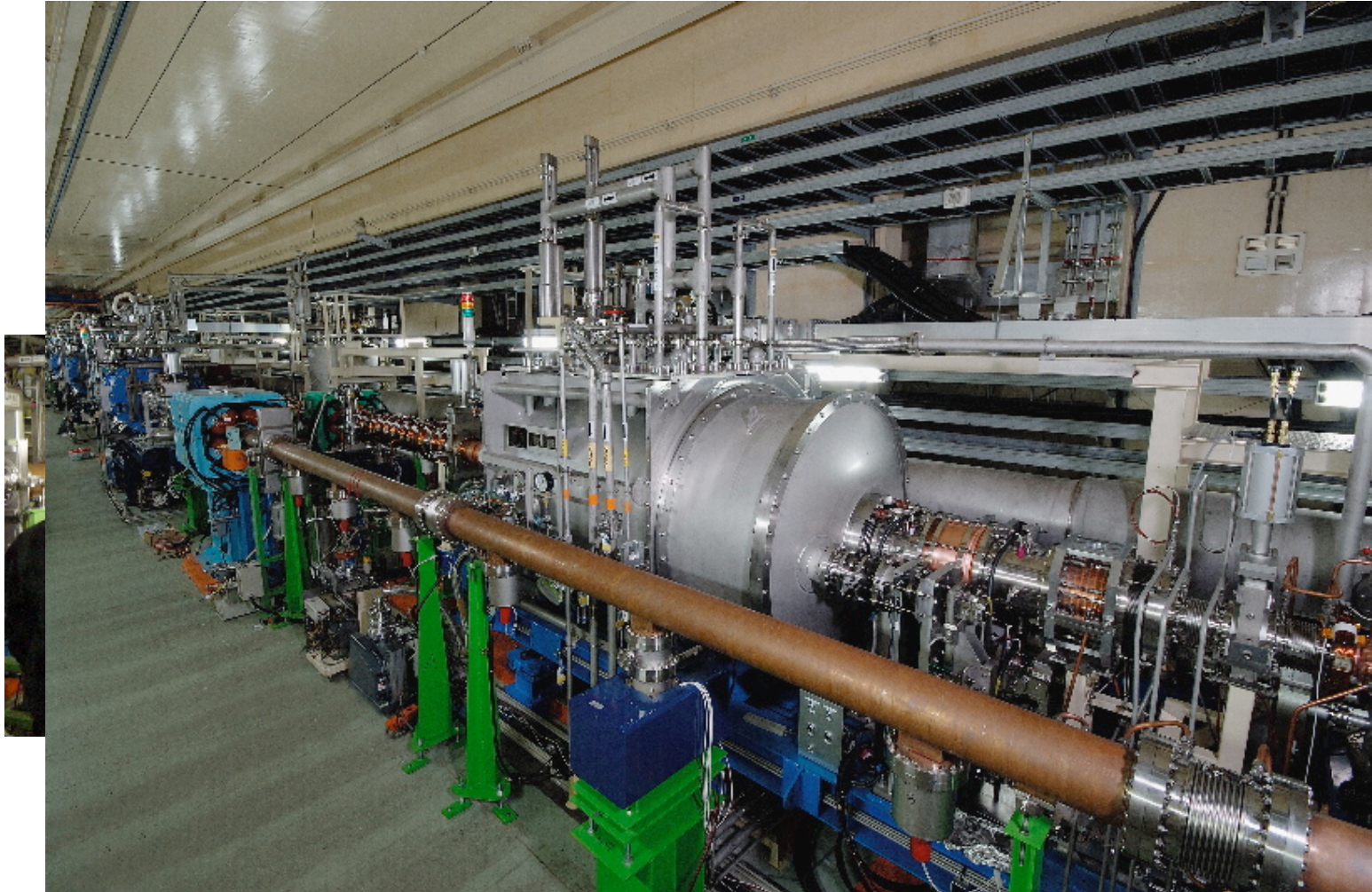


HER
D10



Photos taken by Professional Cameraman: 07/01/25: courtesy MHI

LER
D11

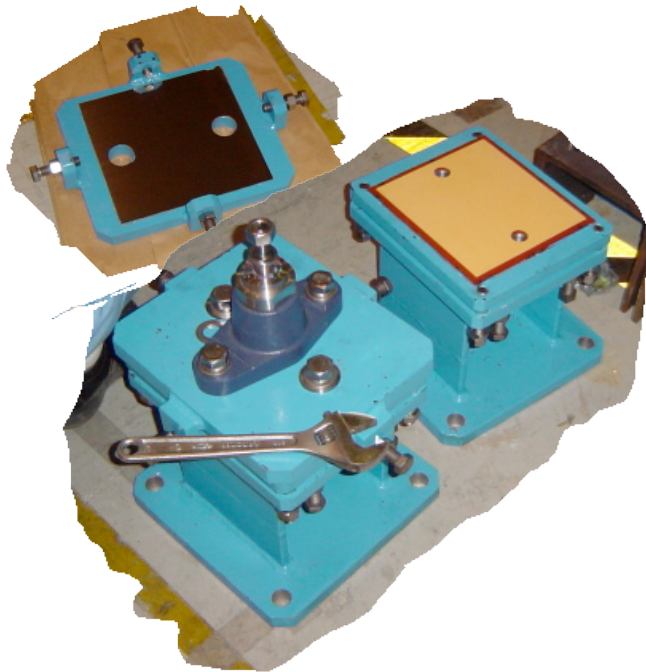


Photos taken by Professional Cameraman: 07/01/25: courtesy MHI

HER; D10
Alignment

07/01/08
Installed

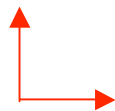
Support leg;
with Sliding pad



07/01/12
After Inst.

	1.0
1.0	×
0.1	×
	0.75

Upward(V)

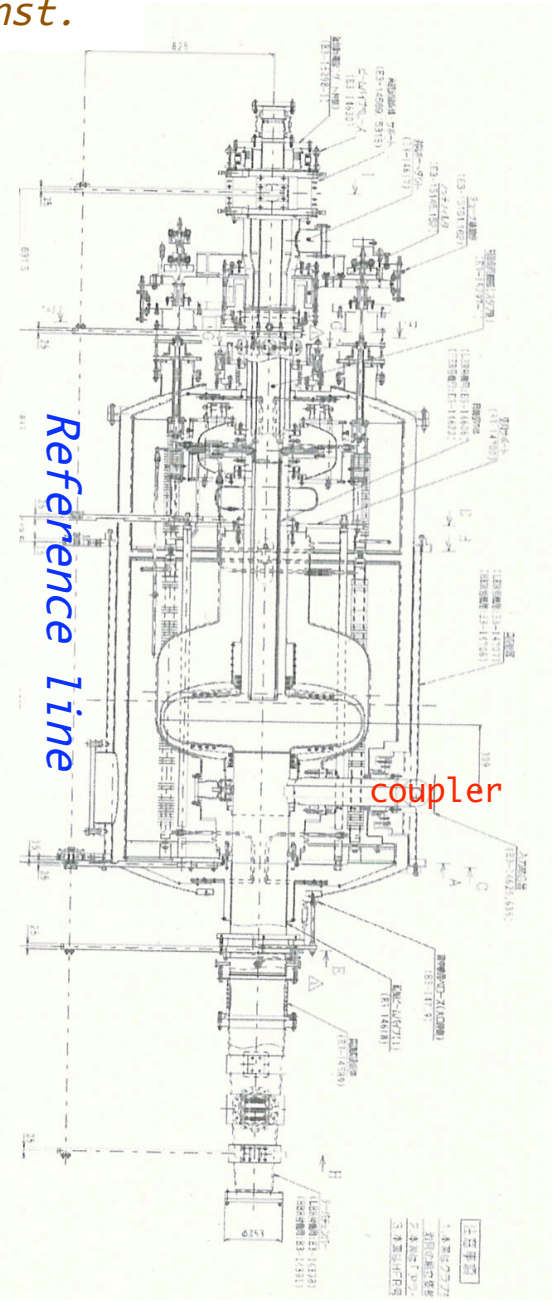
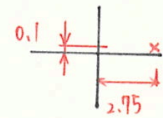
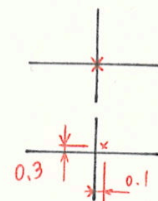
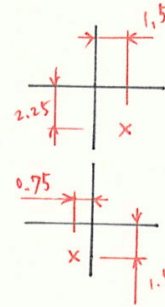


Coupler(H)

Deviation
:mm

1.7	
×	0.5
0.0	×
	1.0

06/12/27
Before Inst.

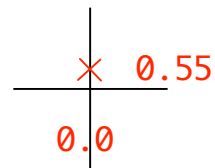
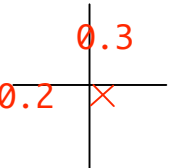
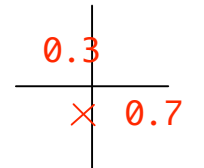
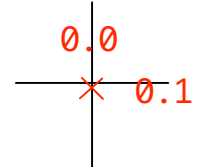
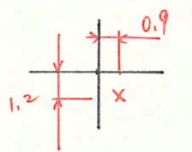
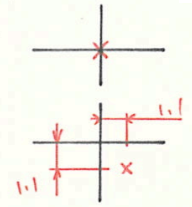
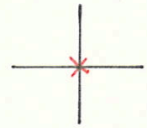
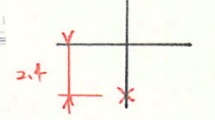
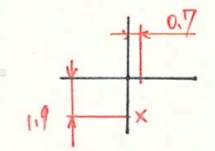
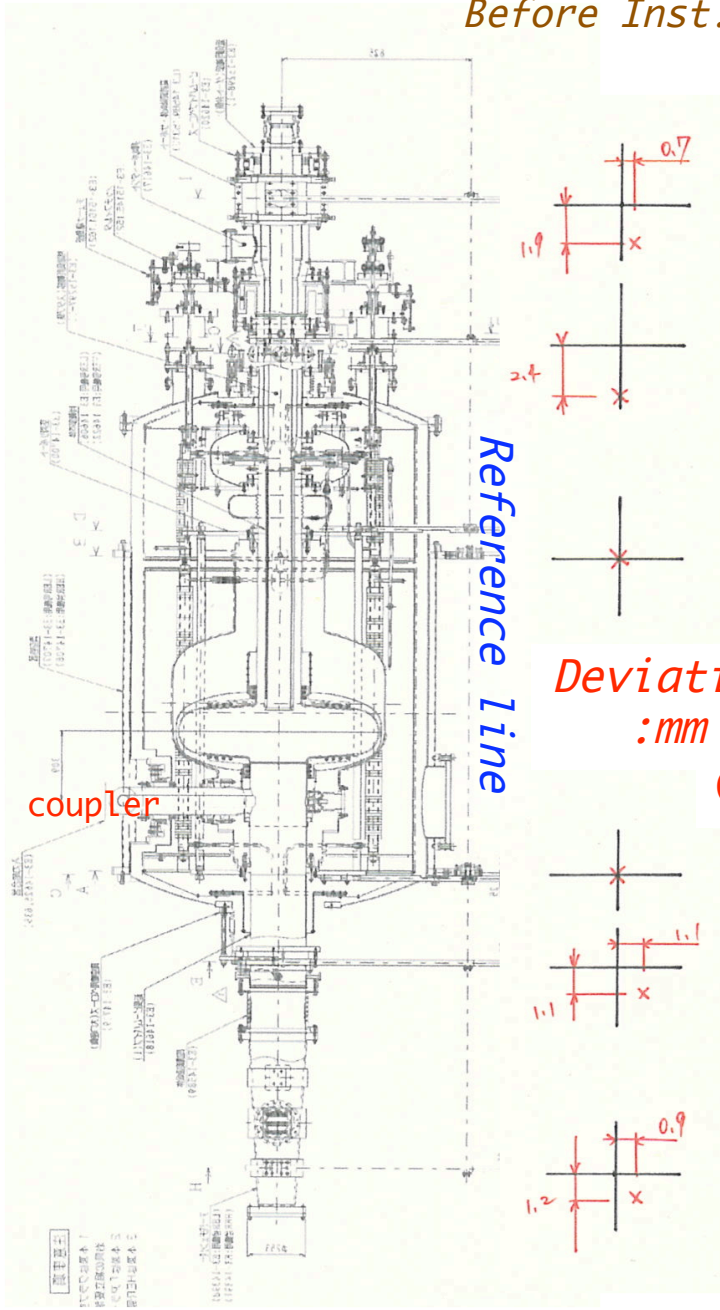


07/01/09
Before Inst.

07/01/15
After Inst.

LER; D11
Alignment

07/01/11
Installed



Upward(V)
Coupler(H)

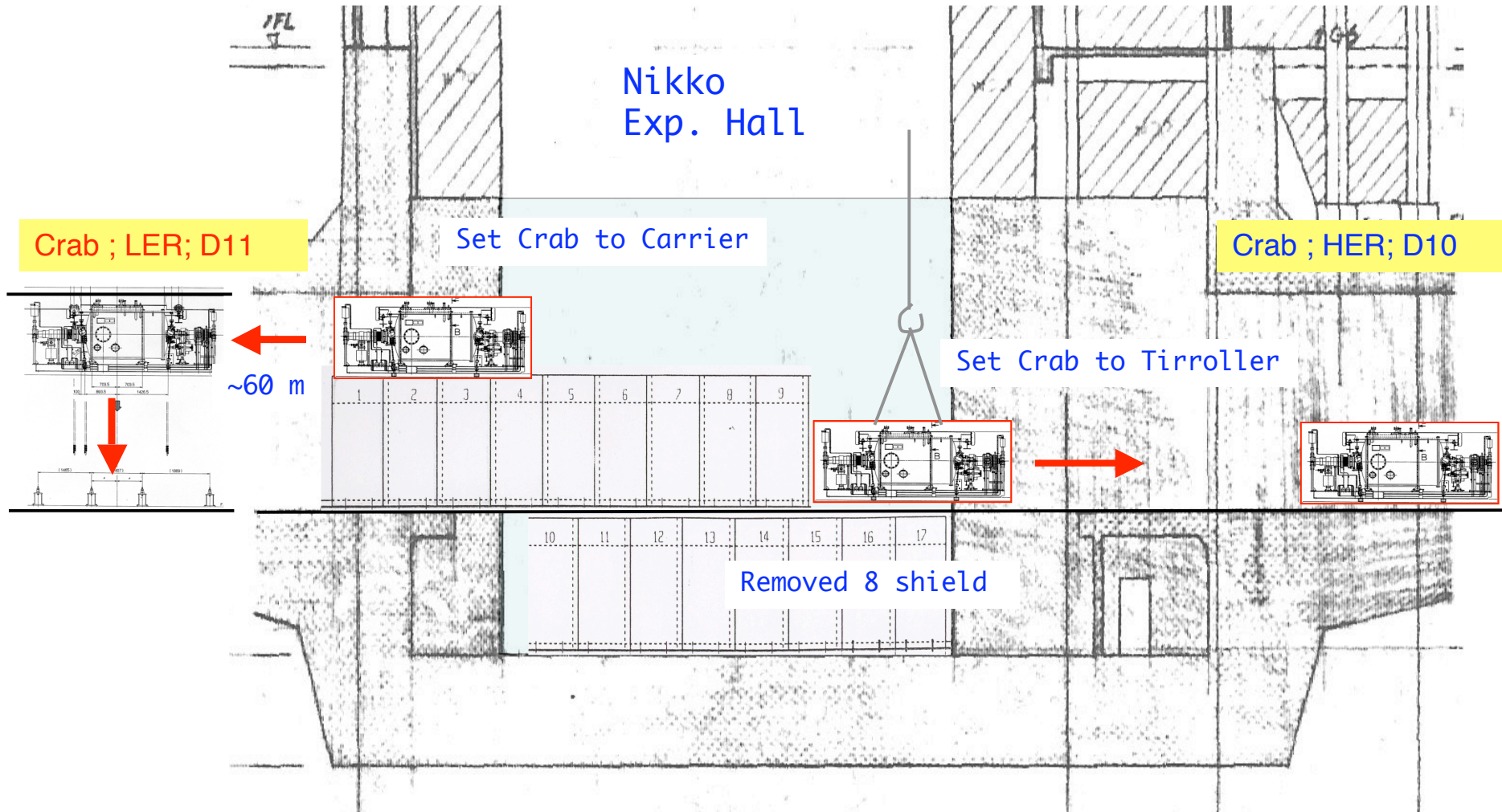
Deviation
:mm

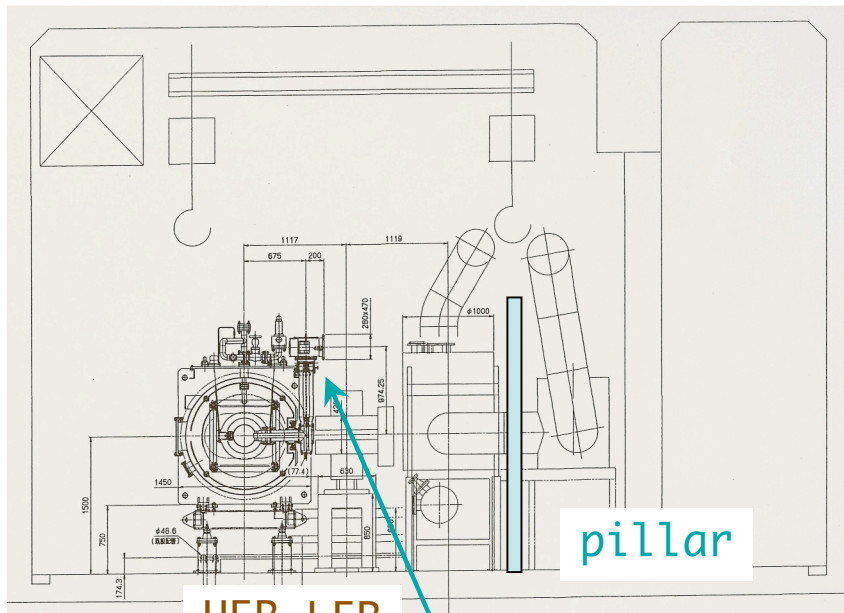
Alignment at Installation:

Ref. line was defined by Q-magnets.

Rotation was checked by a water level (~100μrad).
[can't measure opposite side deviation]

Crab Installation : How to

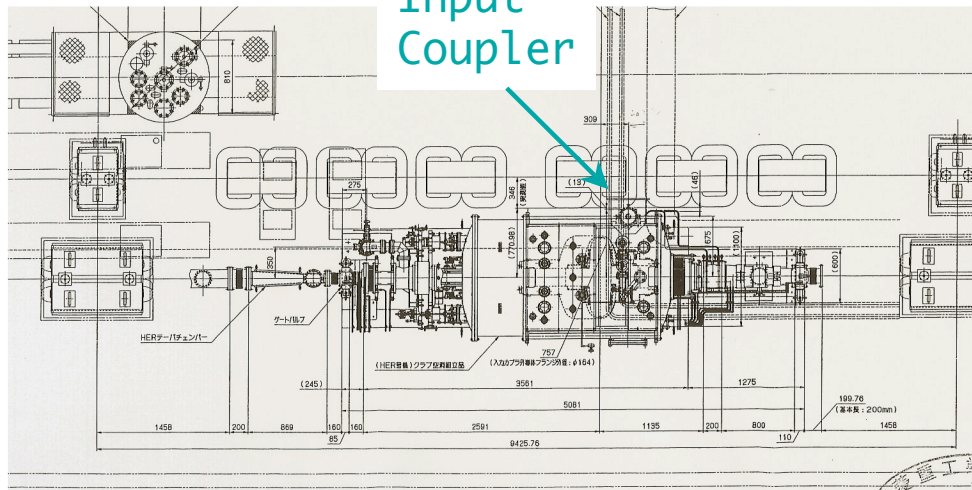




HER LER

pillar

Input Coupler



LER

HER

Crab Installation
: D10

Crab ; HER; D10

Narrow Passage
Crane : Low Lifting Height
: Limited access

Install the Crab with using the **Tirroller**. when the Concrete **Shields** are **Removed**.

Installation Area is **Near** to Nikko Exp. Hall



HER; D10
Preparation



Only HER beam pipe was removed.

Support legs: 4 for weight support/ 2 for flatness

HER; D10
Pulling



10:54; Lifting

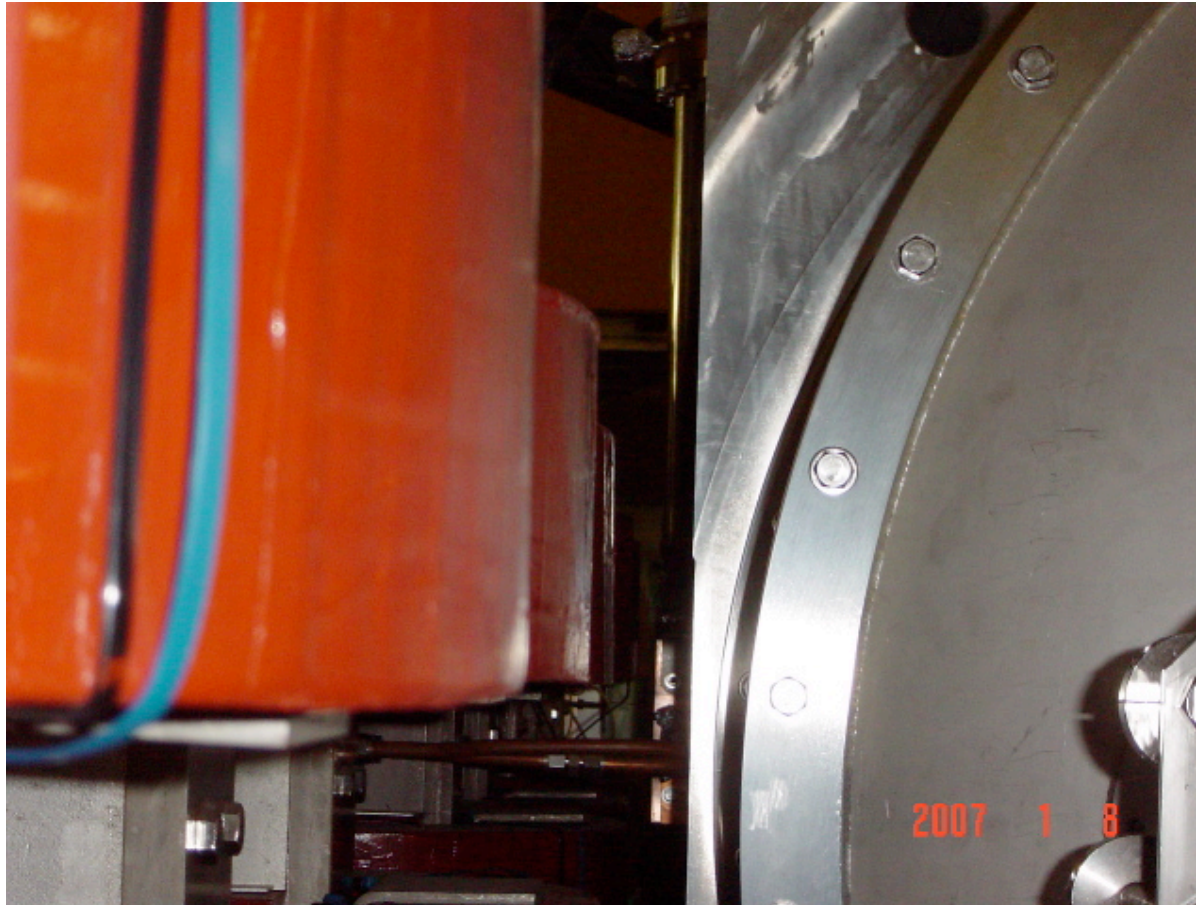
11:08; Landing

11:20; Pulling

11:45; Reach

Crab was put on wooden block to keep higher level above support leg. No crane available.

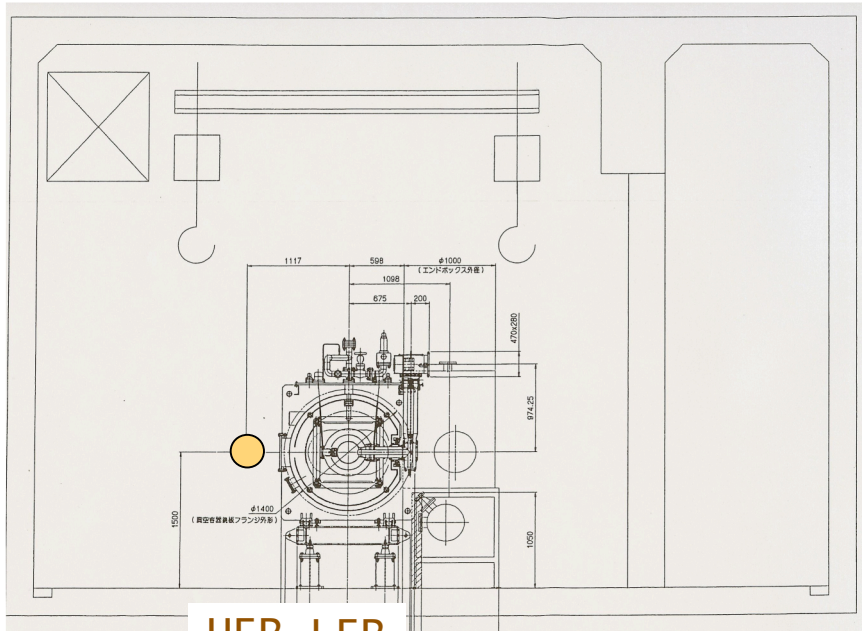
HER; D10
Final
Destination



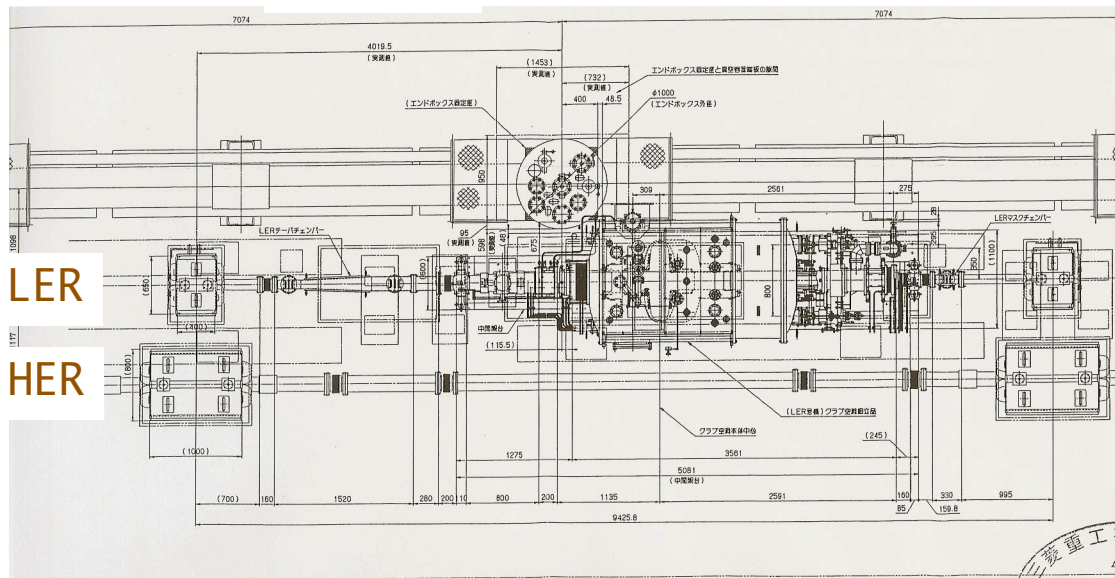
11:49; to Lateral

12:14; Close to

12:22; Close up
to; ~3cm



HER LER



LER

HER

Crab Installation
: D11

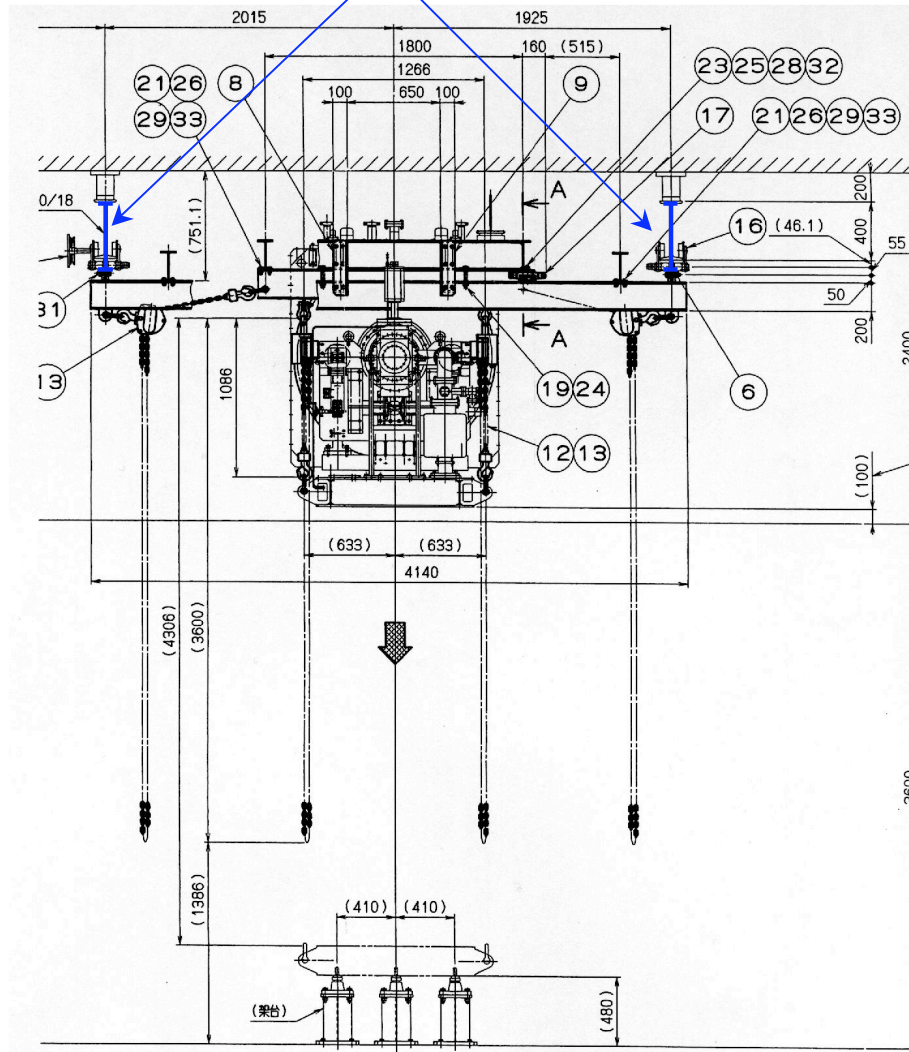
Crab ; LER; D11

Narrow Passage
Low Crane Lifting Height
---> Interfere with SCC

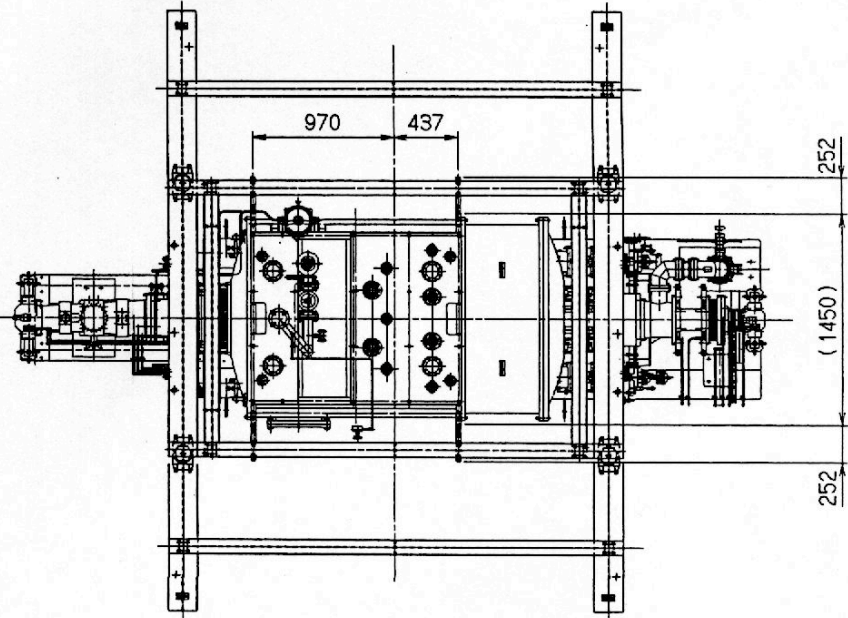
Can use neither the Crane
nor the Tirroller;
---> Need Carrying Tool.

Installation Area is far away
from the Nikko Exp. Hall;
~ 60 m.

Crane Rail



Crab Installation : Carrying Tool



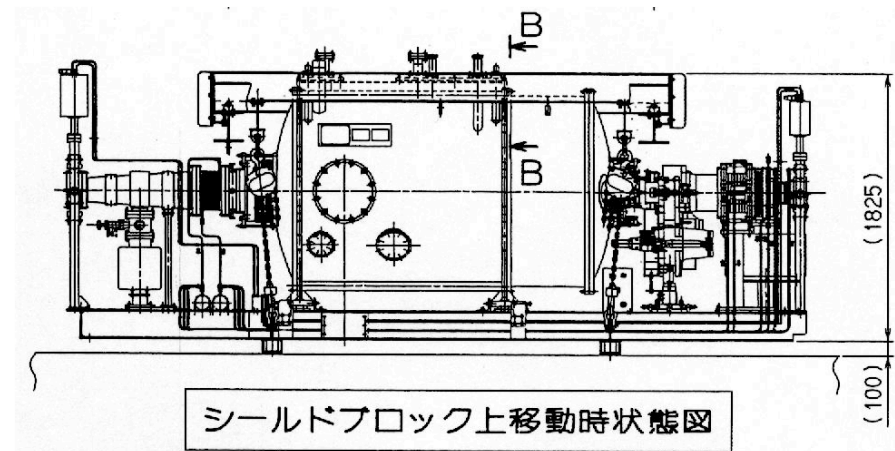
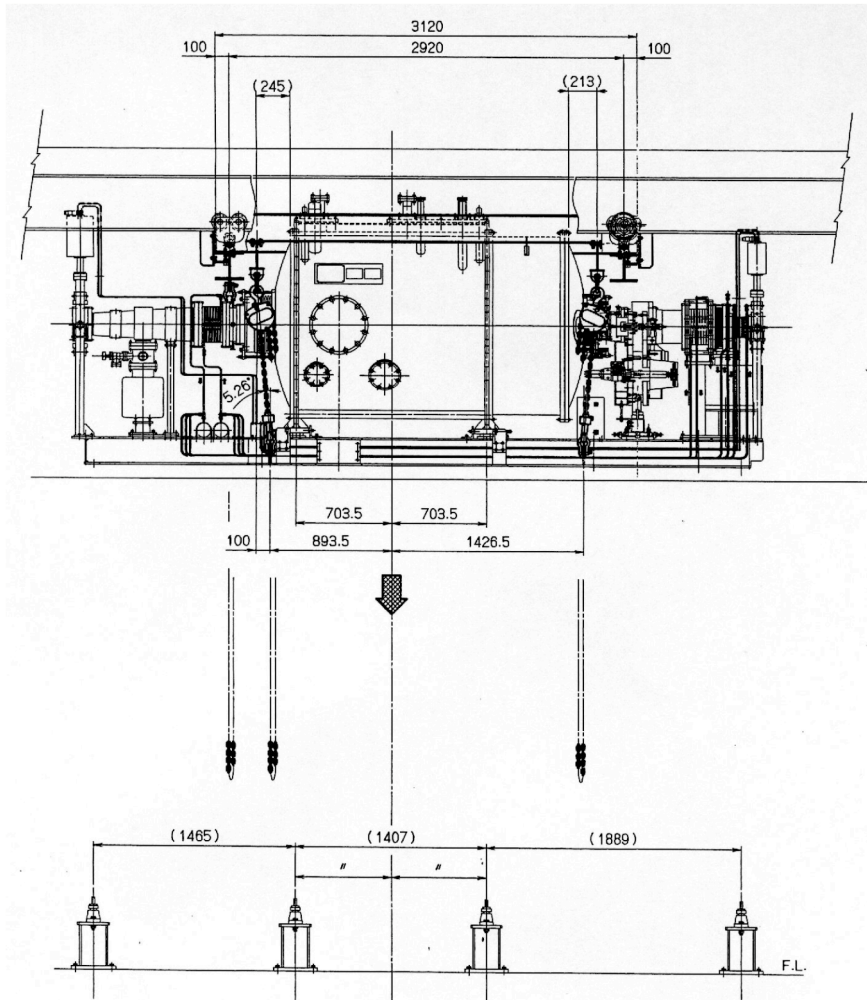
The Carrier ; hanging to the existing **Crane Rail**.

Moving along the rail and perpendicular to it.

Crab Installation : Carrying Tool

Move to the installation area, then hang down
; using chain block(pulley).

Setting the Crab to the carrier;
Carried out on the Concrete Shield.



Crab Installation
: D11 Area
“Animation
Shown Last Year!”



Hours wasted because the strategy changing to cap the carrying frame.

LER; D11
Preparation



10:05; at tunnel

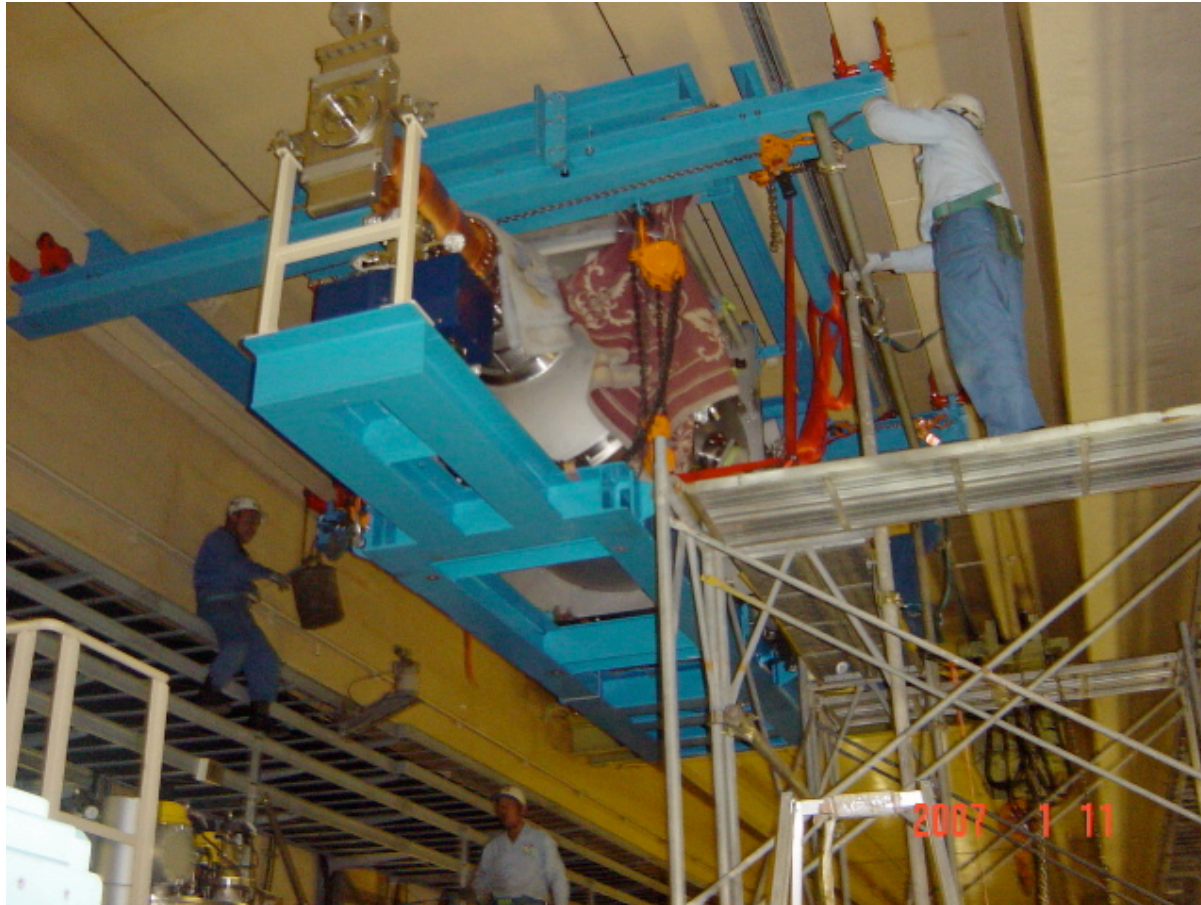
12:04; setting

14:22; hang
forward

15:36; ready
to move

*Both
(LER/HER)
beam pipes
were removed.*

LER; D11
Air
Transport



15:37; take-off

15:38;

15:48;

15:52; arrive

During Transport, Crab was fixed by pulley and sling wires in order to prevent swing motion.

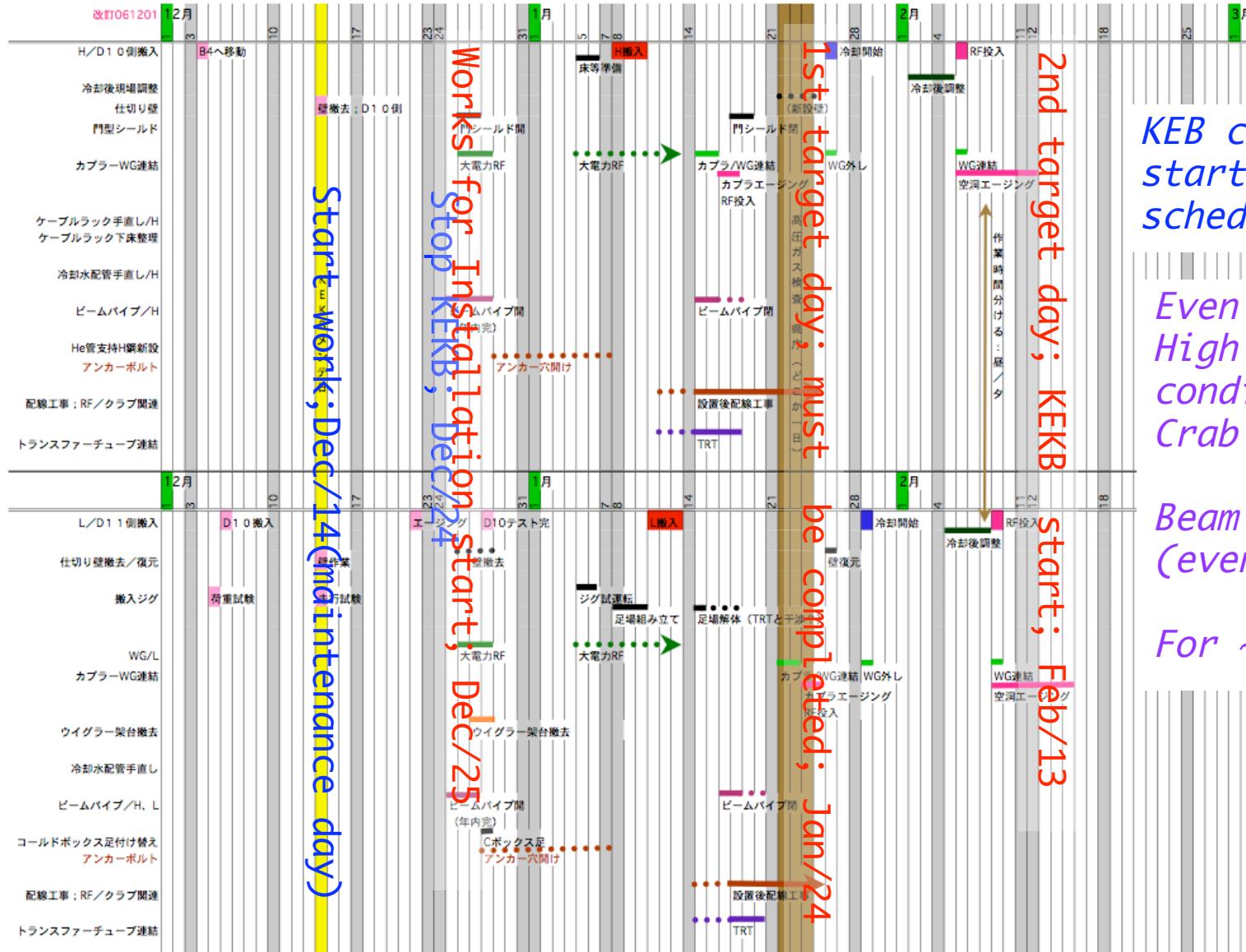
LER; D11
Landing



- 15:52; arrive
- 16:06; release wire
- 16:13; ready to down
- 16:27; down by pulley
- 16:44;
- 17:11; Close to head of support
- 17:18; Rough Adjustment

Support legs

Schedule
(past)
: revised
06/Dec/01



KEB commissioning started as scheduled,

Even though; High Power conditioning of Crab (day time),

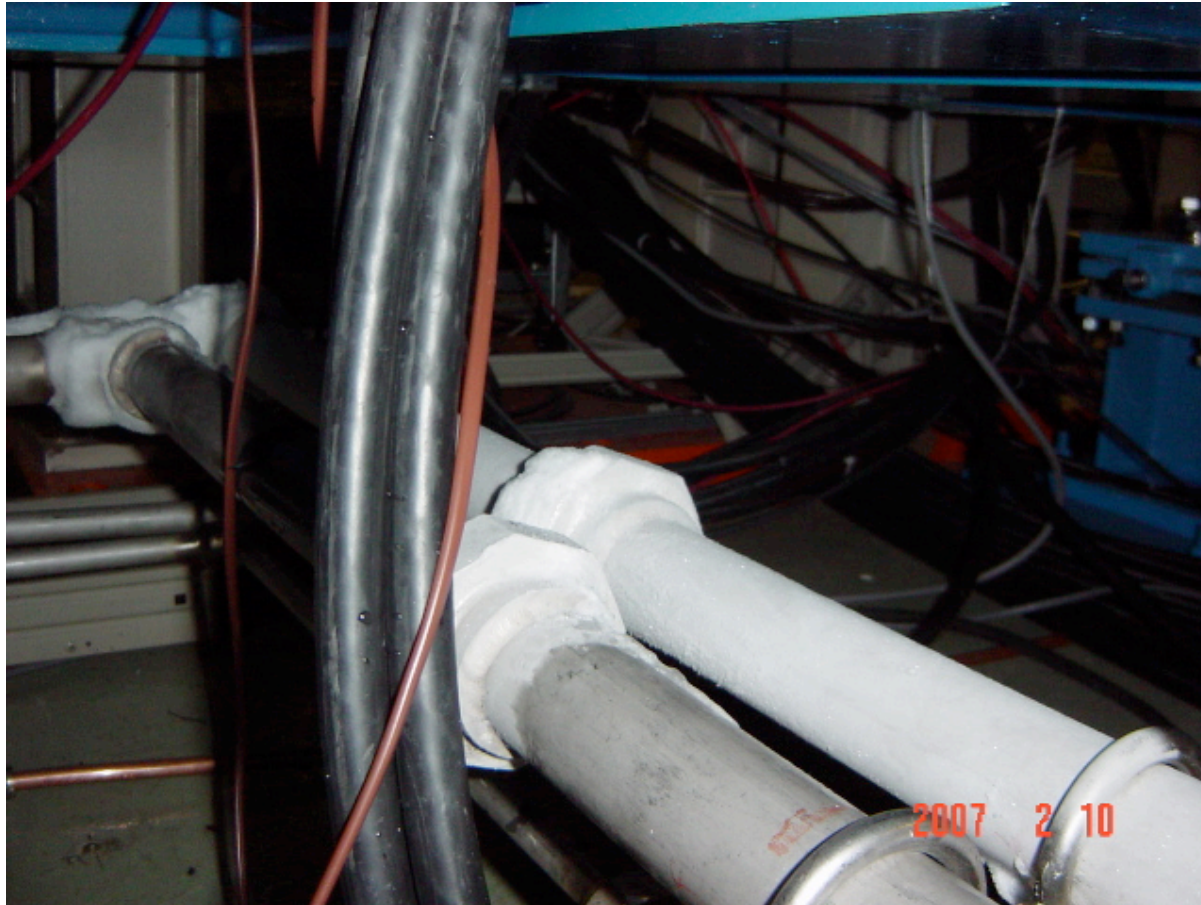
Beam commissioning (evening/night),

For ~1 week.

Scenario of Crab Detach

- 1) No detach if Crab works quite well; Ideal case.
- 2) Detach as scheduled; No beam commissioning expected.
1 month(crabbing tuning) + 1 month(high current),
then summer shut down.
- 3) Detach as soon as possible; Resume Beam commissioning.
~3 weeks shut down (warm up ~1 week, etc.) ~50k\$.
Vacuum scramble may be needed.

Rubber O-ring became hard.



Feb/10; During conditioning

