

# Accident of T-3 in KAGRA Y-arm tunnel

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2021/Dec./16

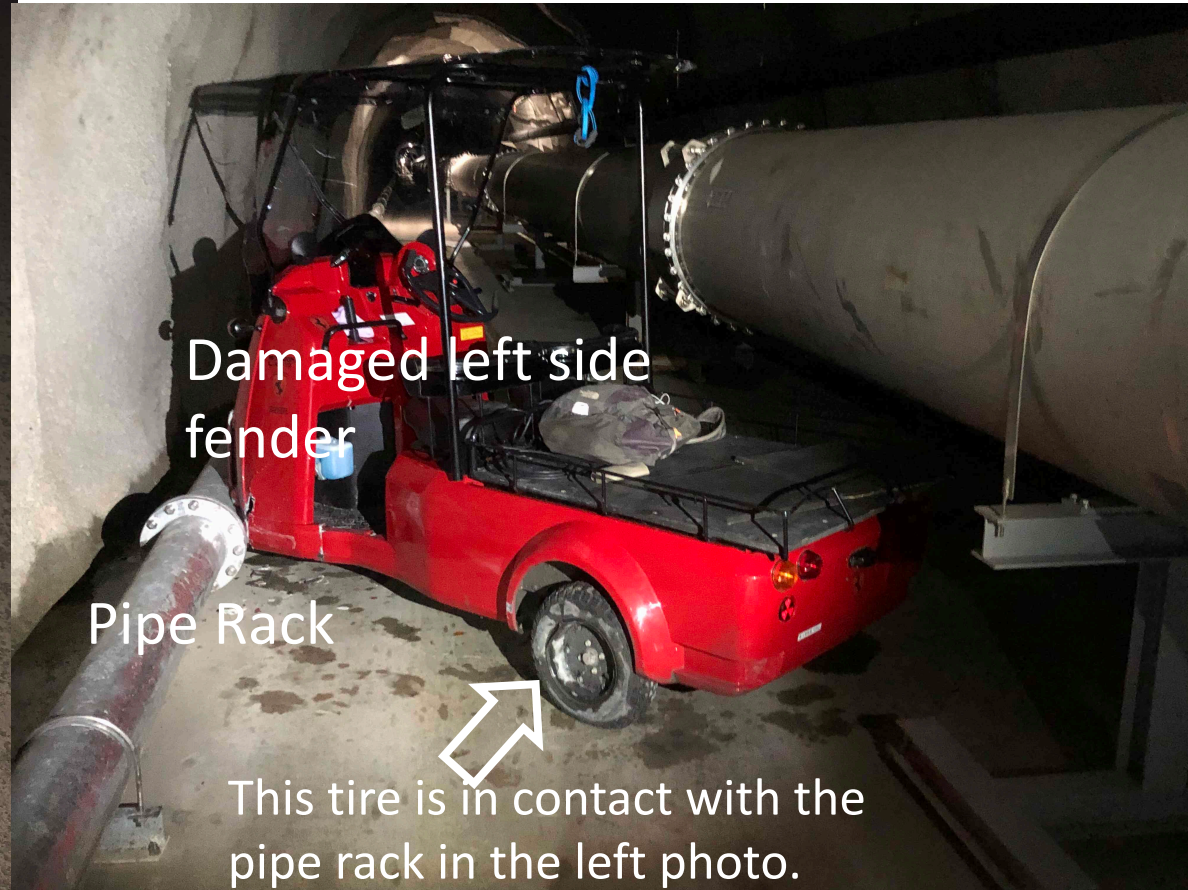
KAGRA PAB Safety

# What happen occurred in the KAGRA Y-arm tunnel:

- ✓ Accidents of mobile vehicle called T-3 in the tunnel:
  - Left rear wheel of a three-wheeled electric vehicle struck a drainage pipe rack.
  - The impact of the collision caused the vehicle to rotate, and operator and three passengers sustained minor bruises.
- ✓ Occurred date: 2021 Sept. 28 ~1 PM
- ✓ Location of the accident:
  - ~1845 m from center area in Y-arm tunnel
- ✓ Factors behind the accident:
  - Vehicle operator was getting impatient to hurry up and resume work after lunch.
  - Because of this, no attention was paid to driving on narrow pass between drainage pipe rack and vacuum duct.

# Situation immediately after the accident

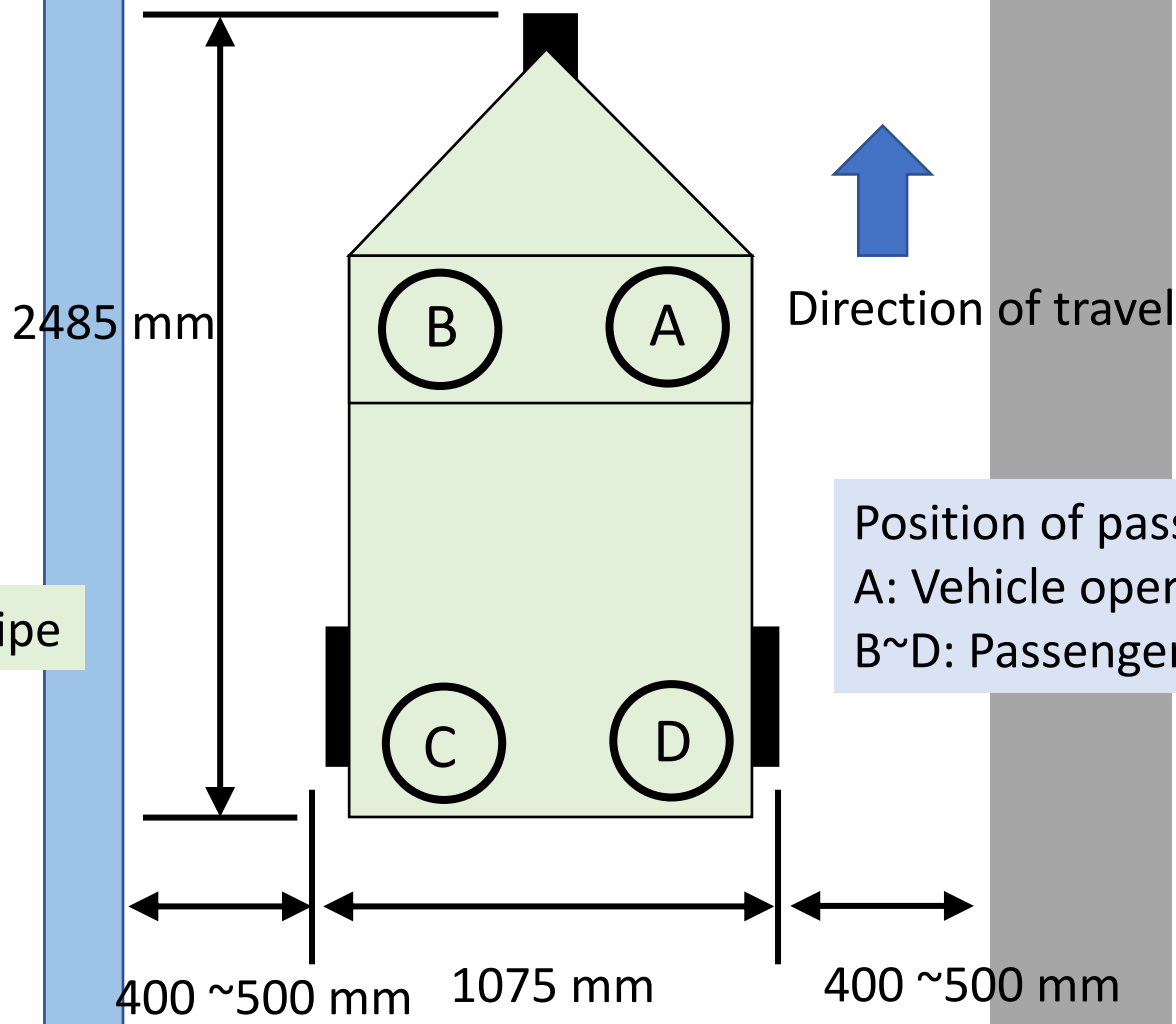
2021/Sept./28 ~1PM



# Illustration of the situation

Vacuum duct in Y-arm

drainage pipe



Position of passenger on board  
A: Vehicle operator  
B~D: Passenger

# Lessons learned and countermeasures for safety

## Lesson learned:

- ✓ Make decisions based on a good understanding of the surrounding situation.

## Countermeasures:

- ✓ Re-train vehicle operator in safety.
- ✓ Compliance with passenger capacity.
- ✓ Installation of signs to pay attention between pipe rack and vacuum duct.
- ✓ Increased lighting in tunnels.



# Incident of vacuum leakage

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# Vacuum leakage at X-15 of X-arm

- ✓ Date: Pressure abnormality was confirmed on 2018 March 22 by status of vacuum monitor at control room.

There was an anomaly reported two weeks ago.

- ✓ What happen occurred:

- Vacuum leakage at X-15 of X-arm

- ✓ Leak point : NW-40 bellow seal valve at X-15  
Center of X-arm (~1500 m)

- Valve knob and shaft were deformed

We assumed side mirror on T-3 hit the valve!

There was no incident report.

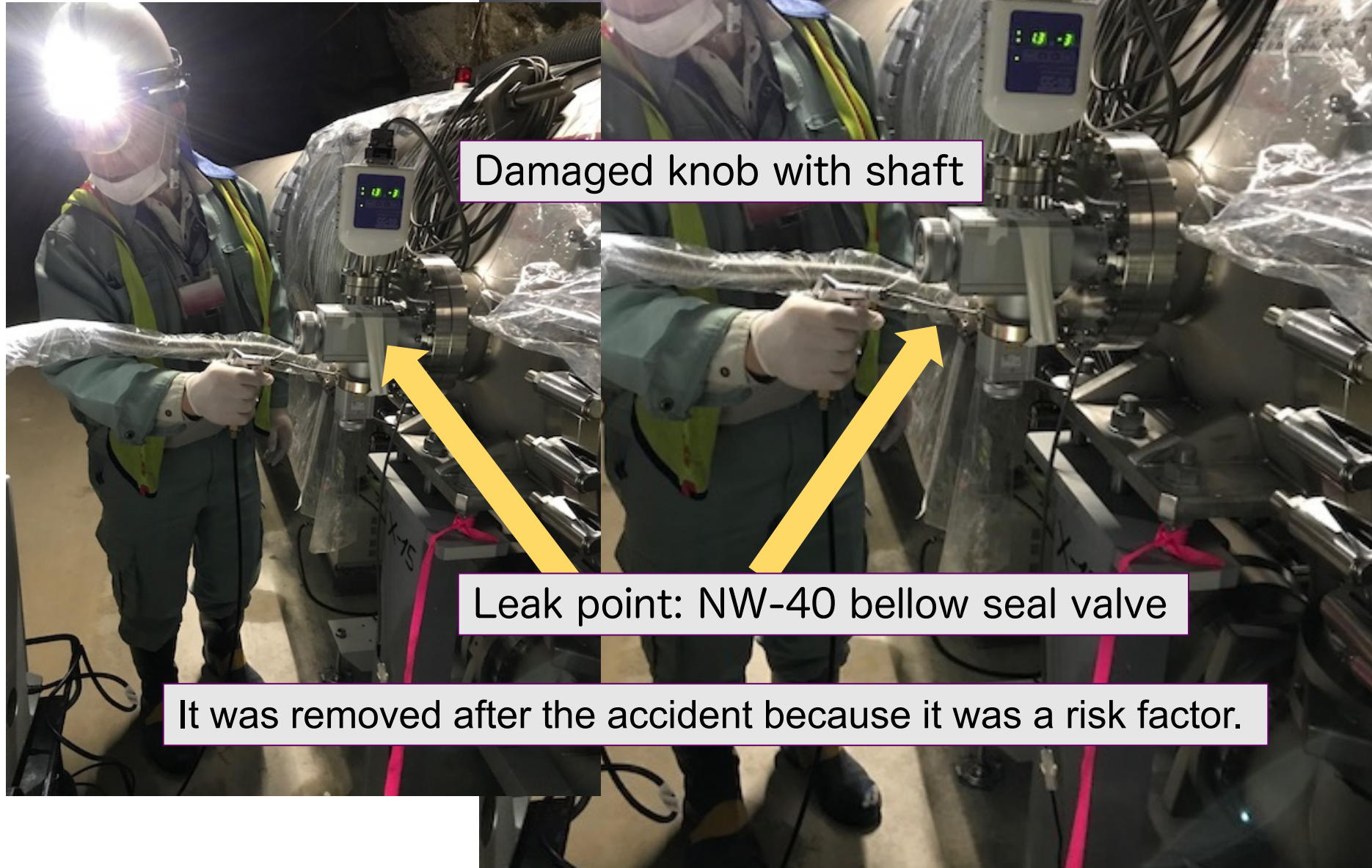
- Leaking from valve plug seal. (Valve was closed)
- Tunnel air was breathed in through a simple sealing section of the air supply system for vacuum breaking that was connected to the valve.

- ✓ Pressure in X-arm duct:

- Pressurized up to  $1 \times 10^{-2} \text{ Pa}$   
(Normal pressure is  $1 \times 10^{-7} \text{ Pa}$ )



# Vacuum leakage at X-15 of X-arm



Damaged knob with shaft

Leak point: NW-40 bellow seal valve

It was removed after the accident because it was a risk factor.

# Lessons learned and countermeasures

## Lesson learned:

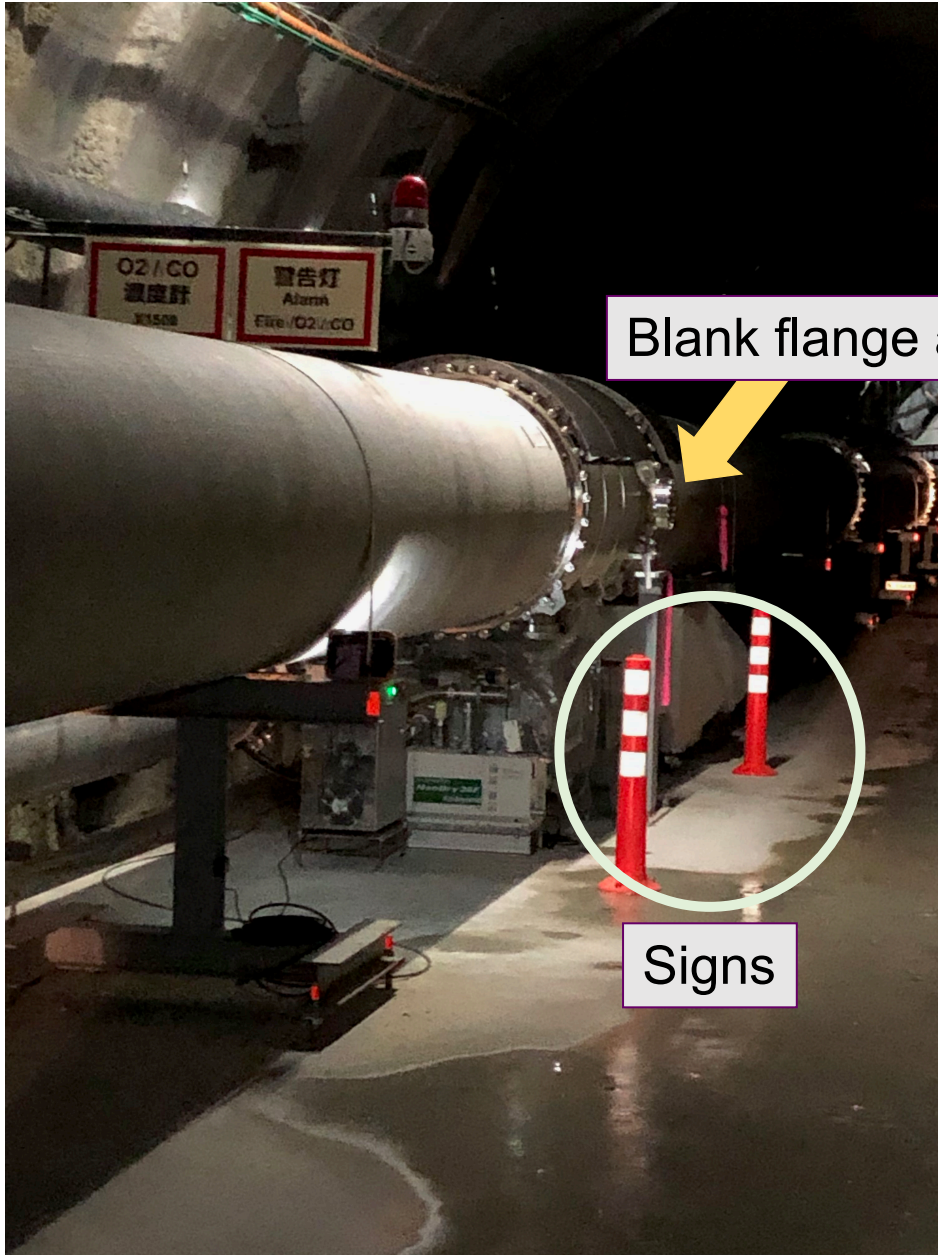
- ✓ Eliminate unnecessary parts that pose a risk of vacuum leakage.

## Countermeasures:

- ✓ Valve and some components were removed after the incident.
- ✓ Installation of signs to call attention to the situation.



# The current status of near X-15



Blank flange after removed valve.

