Development of a Forklift Truck with a Radiation-shielded Cabin

At Mitsubishi Heavy Industries, Ltd. (MHI), we have endeavored to do our part in response to the disaster at the Fukushima Nuclear Power Plant No. 1, caused by the Great East Japan Earthquake of March 11, 2011. In this regard, we proposed a forklift truck with a radiation-shielded cabin, and on April 1, 2011, we assembled a project team to begin development. About one month later, two trucks were completed. The first truck was delivered to the Taisei-Kashima-Shimizu Consortium on May 2, and the second on May 20.

1. Technical background (Fusion of special vehicle/industrial vehicle/nuclear power technologies)

The forklift truck is a product based on our special vehicle, industrial vehicle, and nuclear power technologies. It was expected to contribute to initial environmental improvements in the vicinity of the nuclear power plant buildings, by efficiently disposing of the wreckage while safeguarding the operator in the contaminated area (Figure 1).

![Figure 1 Technical Background](Fusion of special vehicle/industrial vehicle/nuclear power technologies)

2. Development outline and characteristics

(1) Radiation shielding with a sealed cabin

The hermetically sealed cabin is made of thick steel plates (100 mm thick) and lead glass (230 mm thick), and attenuates radiation in all directions by 98 to 99% (Figure 2).
(2) Purified air supply for the cabin
Air purified with a special filter is supplied to the cabin, and the cabin pressure is augmented to prevent radioactive dust from entering (Figure 3).

(3) Anti-radiation countermeasures
Electronic devices (such as controllers) are installed in the cabin to reduce semiconductor deterioration due to radiation.

(4) Shielding of penetrating holes
Penetrating holes for pipes and wires between the chassis and the cabin are filled with lead wool, which provides the same shielding properties as the thick steel plates.

Figure 2  All-direction radiation-shielded cabin

Figure 3  Air purification device

3. Specifications
The main specifications are listed in Table 1.

| Load capacity (container depth of 2,440 mm) | 9 t | Length | 7.3 m |
| Maximum lifting height | 3.0 m | Width | 2.5 m |
| Minimum turning radius | 4.6 m | Height (with mast down) | 3.8 m |
| Weight (including the radiation-shielded cabin) | 30 t |

4. Various attachments
The forklift truck can be used for various tasks by changing the attachments. Sample attachments are shown in Figure 4.