Demonstration of Basket Transportation Between a Station and Equipment Using Automation System in PAVM

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1. Introduction

Pyroprocessing Automation Verifying Mockup (PAVM) has been constructed at Korea Atomic Energy Research Institute (KAERI) for investigating mechanical durability of equipment in molten salt environment and for demonstrating automation of hotcell works [1]. PAVM has a dry room (4 m × 6 m × 2 m) which can regulate its dew point under -40 degree Celsius, and overhead gantry system was installed for basket handling between equipment [2-4]. To see if the gantry system properly installed and how accurate the system is, a basic demonstration was planned. A station mockup to hold a test basket and dummy equipment was located in the PAVM. This paper shows transportation automation between a station and equipment.

Fig. 1. Inside of PAVM and overhead gantry system.

The needs for the non-radiation experimental space were demanded only for molten salt test.

2. Demonstration Setups

A station to hold a test basket is located a side in PAVM. The station has two different slots, and the one is conceptually for the new basket and the other for the used one. Each slot has 5mm margins in each direction so that the overhead gantry system inserts the basket in the proper accuracy without interference.

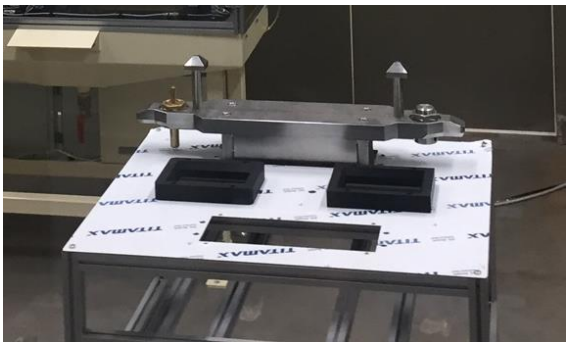

Fig. 2. Station to hold a test basket.

Dummy equipment was prepared in PAVM. A rectangular flange is covered on the top of the dummy equipment, and a slot to insert a test basket is located in the middle of the flange. The test basket has electric connector and a pneumatic coupler at each side, and the top flange has the mate parts for couple it together. A lift module attached side of the equipment to elevate the basket from unload position to load position and vice versa.

Fig. 3. Dummy equipment and lift module.

3. Automation System in the PAVM

In the beginning, the lift is up position to wait the basket. The overhead gantry picks up the basket from the station to the equipment, and install it on the lift module. The lift module moves the transferred basket down, and insert to the slot. When the basket motorized down, not only the mechanical connection but also the electrical and pneumatic connection is made at the same time.

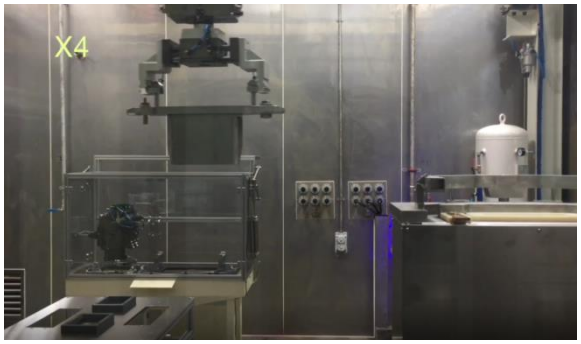

Fig. 4. Automatic transportation of basket by using the overhead gantry system.

After treatment of basket in the equipment, the basket lifted up again, and call the overhead gantry system to extract the basket. The overhead gantry approaches to the equipment and snap the basket out. The used basket transported back to the station.

Fig. 5. Basket installation in the station.

4. Conclusion

The PAVM was successfully constructed including overhead gantry system. By using the gantry system, a demonstration to automatically transport a test basket was conducted. Accurate motion of gantry system shows the possibility of automation in nuclear application. Further experiments were under progress in PAVM.

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