

## Conceptual Design of A-Frame Type Fuel Transfer System with Horizontal Movement in SFR

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### 1. Introduction

The A-frame fuel transfer system is designed in type of removing the spent fuel from the reactor and bringing the new fuel into the reactor inside from a specific location outside the reactor using an A-frame type fuel transfer port. In large scale reactors, double rotating plugs are primarily applied, and most of these reactors use A-frame fuel transfer ports to minimize the process and distance of withdrawing spent fuel assemblies from inside to outside of the reactor. The A-frame fuel transfer system moves fuel assemblies mainly by rotary movement from the top of the reactor. French PHENIX, European EFR, and Indian PFBR use rotatable movement type A-frame devices.

In this study, A-frame devices that move horizontally from the top of the reactor were conceptually designed and the structure and configuration are shown in Fig. 1.

### 2. Conceptual Design of A-Frame Type Fuel Transfer System with Horizontal Movement

The spent fuel assembly inside the reactor moves to the fuel transfer port by the in-vessel transfer machine, which is loaded into the fuel transfer basket prepared in the fuel transfer port.

Initially, vertically positioned fuel transfer basket tilts  $14^\circ$  relative to the vertical line due to the tensile force of the connected chain, which is withdrawn out of the reactor through an inclined A-frame transfer port.

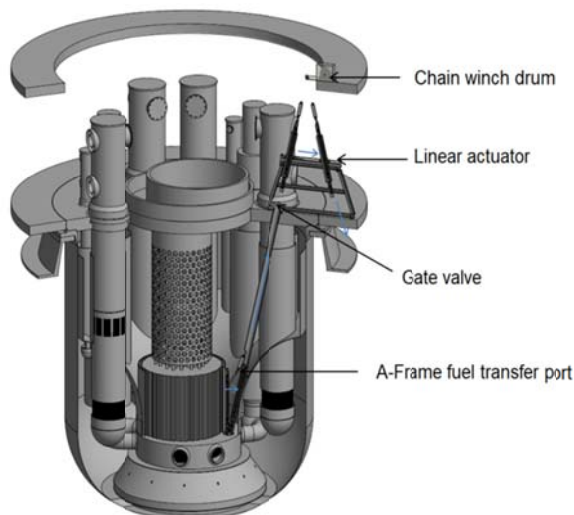


Fig. 1. Conceptual design of A-frame type fuel transfer system with horizontal movement

In addition, the reactor is shielded by the opening and closing of the gate valve installed on the reactor head. The fuel transfer basket withdrawn out of the reactor moves horizontally by the linear actuator and the tilting system, which is transported to the opposite end. At this time, the chain connected to the fuel transfer basket moves around the guide roller of the chain winch drum installed at the top of the reactor. At the end of the linear actuator, the fuel transfer basket is tilted to  $-14^\circ$  using its own locking device and moved down to the temporary fuel storage. Fig. 2 shows the conceptual design configuration of the lower and upper parts of the A-frame type fuel transfer system with horizontal movement.

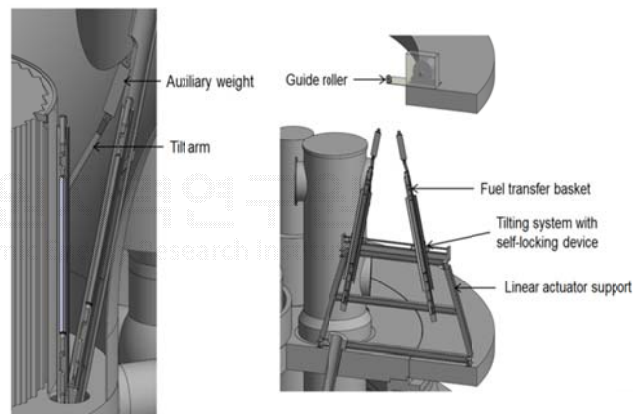


Fig. 2. Lower and upper parts of A-frame type fuel transfer system with horizontal movement

### 3. Conclusion

The conceptual design of A-frame type fuel transfer system with horizontal movement in SFR was performed, and the driving mechanisms for the movement and the support structure were reviewed.

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### REFERENCES

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