Development of Movable Pool Hanger in Research Reactor Pool

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1. Introduction

The research reactor pool includes special tools, instrumentations, underwater camera, etc. for reactor operation, isotope production and fuel handling. To support the structures described above the pool hanger is installed in the pool wall under the consideration of configuration and position of structure hanging in the pool hanger.

The existing pool hanger attached to the embedded plate in pool liner has not only restrictions for moving from one location to another and replacement with new one, but also careful attention for deciding the position not to interface with the other structures because it is attached in the embedded plate by welding method. To resolve these limitations, the detachable pool hanger but not permit slipping during seismic event is developed and its characteristics are presented.

2. Background

2.1 Current Pool Hanger

The current pool hanger attached to the embedded plate by welding method requires especially welder qualification, welding inspection and cleaning during the installation process. Also, this method requires the embedded plate at every position where the pool hanger is installed and the determination of exaction position of pool hanger before installation. Figure 1 shows the typical design of pool hanger. The embedded plate increase the welding part to the pool liner and that is not desirable from a viewpoint of structural integrity.

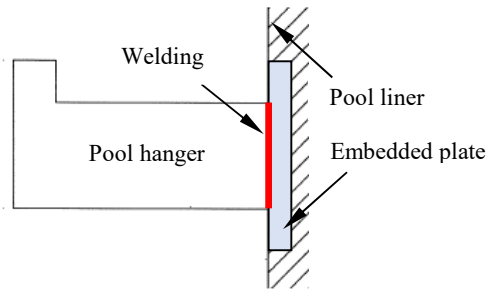

Fig. 1 Current Pool Hanger

2.2 Concept of Movable Pool Hanger

The detachable pool hanger is attached to the beam type support structure instead of embedded plate without welding with which accompany welding inspection, and that makes the change of installation position possible.

The both ends of the support are anchored into the embedded plate and accommodate a large number of pool hangers as long as the span allows. However the length of span is limited to maintain the structural integrity during seismic event.

3. Design of Movable Pool Hanger

3.1 Description of the Components

The movable pool hanger consists of guide structure, positioning channel, hanger bracket and fixing bolt. Figure 2 shows the four (4) components of movable pool hanger.

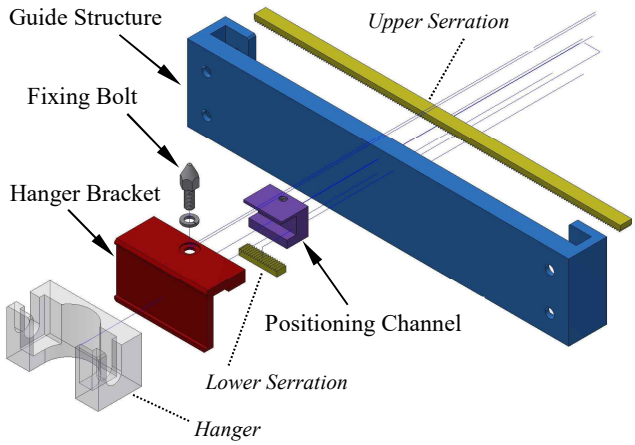

Fig. 2 Components of the Movable Pool Hanger

The guide structure with channel shape is attached to the embedded plate in pool liner by bolts and supports the hanger bracket. The component of upper serration is included in the guide structure to prevent the slipping of the hanger bracket during seismic events. The upper serration is clamped with the lower serration in the positioning channel.

The positioning channel links the hanger bracket to the guide structure. The lower serration in position channel is clamped with the upper serration in guide structure. Tap hole for the fixing bolt is included to link the hanger bracket.

The hanger bracket is assembled to the positioning channel by the fixing bolt and the pool hanger is attached to the hanger bracket.

The fixing bolt fix the hanger bracket and makes it possible detaching the movable pool hanger by loosening it.

3.2 Adaptability to the Research Reactor

Loosening the fixing bolt induce the separation of lower serration from the upper serration and makes the fine adjustment of hanger bracket position possible to the amount of serration pitch.

When the hanger modification is needed, the movable pool hanger is to be derived from the support structure by dis-assemble of fixing bolt which locates the vertical direction for the easy to access. Figure 3 shows the fixing bolt with which assembles all component together.

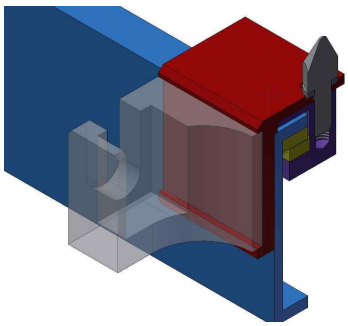

Fig. 3 Cross-Section of Movable Pool Hanger

3. Conclusion

The movable pool hanger has characteristics of the movability and the detachability. The movability of that helps the work efficiency when that's position change is required. The detachability means that the movable pool hanger is removable from the pool liner without grinding. Bolt joint type makes the possible the existing pool hanger with new one without grinding which requires time and labor.

This paper shows that the developed design of pool hanger is applicable to the research reactor pool and needs for the evaluation of structural integrity on the movable pool hanger during the seismic event in the future.

Acknowledgements

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