THE DEVELOPMENT OF THE UNDERWATER INSPECTION VEHICLES FOR NUCLEAR POWER PLANTS

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1 INTRODUCTION

There are many underwater structures in the Nuclear Power Plants (NPPs), and due to high radiation and underwater condition it’s very difficult to carry out inspections in these areas. Remotely Operated Vehicles (ROVs) equipped with some thrusters and a CCD camera, have been in use for underwater remote inspections for the structure. Because these conventional ROVs for nuclear power plants can’t acquire stable images and/or do not have any tools except for a camera, they have been applied to the restricted inspection tasks for nuclear power plants. HITACHI has been developing several ROVs, which are equipped with some additional functions and devices, in order to improve the performance of the conventional ROVs.

2 NEW EQUIPMENT

(1) S-type ROV (Basic Type)

The S-type ROV was developed for accessing Vessel Bottom and inspecting the Shroud Support in the leg type RPV internals. In order to access the vessel bottom, the ROV was designed to be small enough to be able to pass through Top Guide and Core Plate. This ROV can be equipped with unique legs to provide the stable images and also with UT function. This ROV has been applied for the underwater wall inspection in the NPPs.

(2) M-type ROV (Miniaturized ROV)

The M-type ROV was developed for accessing the under side of Shroud Support in “BWR-2” which has the Flaw Baffle. This ROV is designed to be miniaturized φ155mm in size and spherical in shape so that it can be able to pass through the gap between the bottom edge of the Flaw Baffle and the inner wall of the RPV. This ROV has been applied for the under side of the Shroud Support inspection in BWR-2 plant.

3 CONCLUSIONS

HITACHI is developing several ROVs, which can carry out the inspection for these areas and overcome the difficulties. These ROVs have been used in the real plants and have proven to be useful and effective in the inspections of the structures that are difficult to inspect with the conventional ROVs.