

## Case study 012

# Welding and quality professions in one: A case for spiral case welding improvement

## 1 Project background

Edevu hydropower plant is a private invested power plant in Northeast of Port Moresby. The hydropower plant will provide 54MW to the Port Moresby Grid and aims to stabilize the power supply in Port Moresby region. The project is currently in the equipment installation stage and spiral case construction was a critical task for the success completion of the hydropower plant. Spiral case is important due to the complexity during operation and the high integrity requirements to ensure safely and reliable operation. In this context, a shareholder of the plant decided to recruit a welding engineer to assure the quality of the spiral case welding.

CWI was approached by the shareholder to conduct a welding and quality improvement programme to improve the welding practice and quality for the spiral case. CWI provided an experienced welding engineer qualified to certified international welding engineer and chartered quality professional to perform the welding and quality improvement programme through a three-week support at the project site.

## 2 Process

For the purpose to execute the improvement programme effectively and efficiently, a two-stages programme was designed by the welding engineer. The stages of the programme are:

- Stage 1: Surveillance, planning and development
- Stage 2: Implementation, coaching and improvement

The process of this programme is illustrated in the flow chart given in the Figure 1 and the activities in these two stages are also included in the flow chart.

### Stage 1: Surveillance, planning and development

In the stage 1, gap analysis and practice surveillance were conducted parallely. The gap analysis focused on identifying the gaps with respect to standard requirements; preparation to perform welding and inspection activities based on requirements; and personnel competency.

Further to the gap analysis, action plan was then developed further to the gap analysis for achieving compliances.

The practice surveillance focused on identifying the incorrect welding and quality control practices against the industrial best practice, standard and procedure requirements. During the practice surveillance, immediate rectification actions were given to rectify and stop the incorrect practice and prevent it from recurrence.

In the process of action plan development, welding activities were held to prevent incorrect practices were adopted to damage the material of spiral case. Also, the welding team was instructed to perform rectification action to rectify the work conducted using incorrect practice. The inspection team was asked to prepare inspection documents, including inspection report templates and acceptance criteria based on the inspection standards; and their inspection method and personnel competency were also verified. The welding engineer prepare a comprehensive method statement with the detail methodology and requirements to control the quality of welding.

## **Stage 2: Implementation, coaching and improvement**

The stage 2 is a continuous and daily repeating process. This stage focused on implementing the actions developed from the gap analysis and the rectification actions to prevent recurrence of incorrect practice. In the action implementation activity, welding and inspection teams were briefed about the actions and requirements and welding and inspection supervisors were coached to monitor their team members for complying to requirements.

After the action implementation, the improvement programme proceeds into daily compliance monitoring and surveillance and non-conformance rectification activities.

The daily surveillance work was conducted by the welding engineer on spot check basis to survey compliance of welding and inspection teams to the requirements of method statement and welding procedure. This process was repeated daily until the welding engineer demobilise from the project site.

### **3 Outcomes**

The outcomes of the daily surveillance showed that the welding practice and welder compliance to welding procedure have been improved and no incorrect practice was adopted again. The inspection results showed that 99.95% of the weld length were accepted and the hydrostatic test was accepted at the first attempt. The Figure 2 shows the photo of the spiral case during the improvement programme.

The outcomes of this improvement programme showed that the combined method of welding and quality professionals adopted by CWI have resolved the welding quality and integrity concerns raised by the shareholder of Edevu hydropower plant and improved the work paradigm of the spiral case welding and inspection teams.

Spiral case welding and quality improvement process

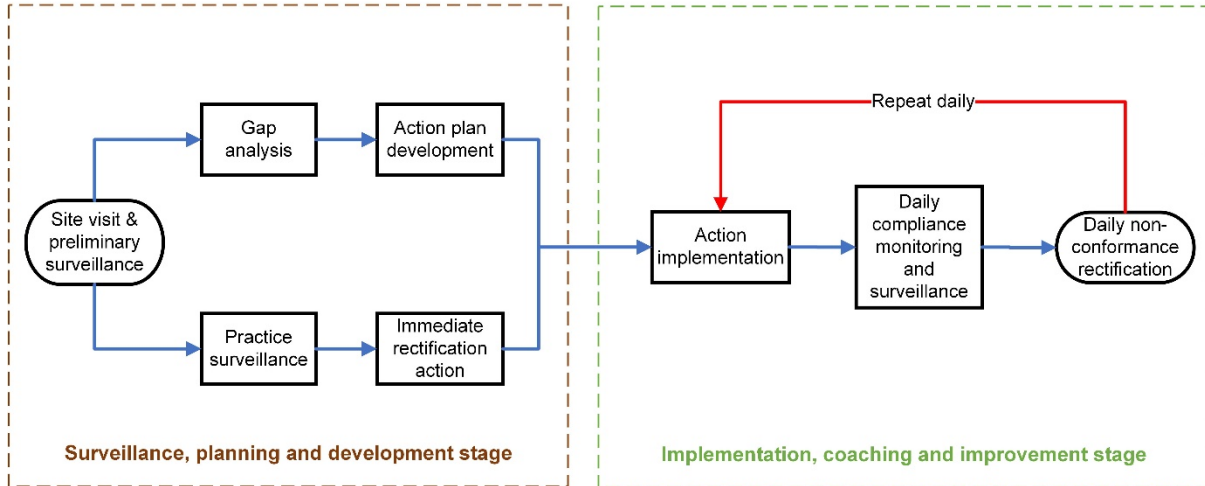


Figure 1 The spiral case welding and quality improvement process



Figure 2 The spiral case of Edevu hydropower plant during the improvement programme.