

In-house Test Rig Facility for Pot Tending Machines

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Abstract

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Technology allows us to use a remote controller to fully operate pot tending machines (PTMs). Newly arrived brand new and repaired PTM remote controllers must be fully function tested before they are allowed to replace and be used in the pot lines. Testing these remotes should be safe, reliable and hassle-free. Hence, an in-house test rig facility specifically designed to test this type of remote controller was conceived and constructed to satisfy the requirements of a full function test. The test rig facility, which has been carefully designed, commissioned and approved before putting it to use, has eliminated the need of a PTM to be transferred to the maintenance bay area to install and test a new or repaired remote controller. It also eliminated the risks involved in doing the task. Testing the PTM's remote control system is simplified into plugging into the test rig facility the remote controller's receiver, open the corresponding software, go online and start full function test.

Keywords: PTM remote controller, PTM remote control test rig facility, PTM remote control function test, PTM maintenance bay, PTM remote control receiver.

1. Introduction

Emirates Global Aluminium (EGA) is one of the aluminium companies who still uses first generation PTMs with remote control system as an option to fully operate a PTM as shown in Figure 1.

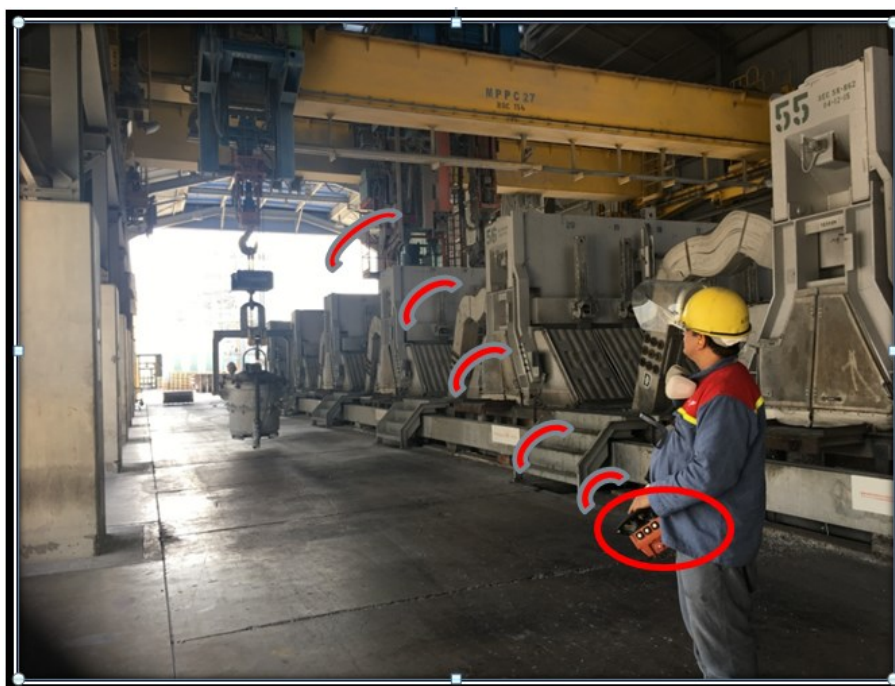


Figure 1. Pot tending machine operated from a remote controller.

Using a remote control to operate the PTM enables the operator to have a better vantage point at a safe distance. This remote control is mainly used during metal tapping, bath tapping, metal pouring, bath pouring and beam raising.

A PTM remote control set consists of two main parts; the receiver unit which will be installed on the crane (Figure 2) and the transmitter box which is the remote controller (Figure 3).

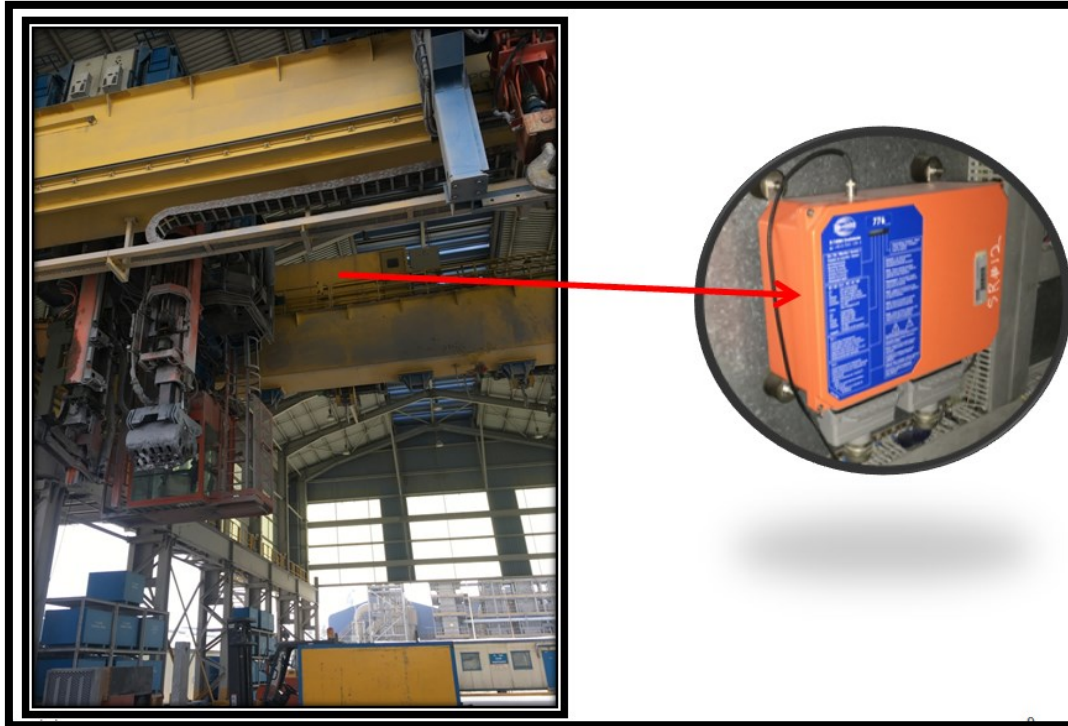


Figure 2. Remote control receiver installed inside the PTM electrical room.



Figure 3. Remote control transmitter.

5.1. Examples of Test Sessions

Example 1:

A new remote controller arrived to stock and the warehouse requested to inspect the material and update to accept to stock. To test the complete functions of remote controller required for PTMs, we need crane availability which includes crane arrangement operation re-schedule, crane transfer, installation and test. To overcome the requirement of crane availability on site the test rig will help. We will connect the receiver unit to the test rig plugs and start testing. During the test we can see the following:

- Emergency push button activated/de-activated,
- Joystick analog values,
- Push buttons activation and de-activation as per required specification,
- Toggle switch operation, etc.
- Another important inspection is for remote transmitter display; it should display the correct alarms as per configuration and display the tools selection.

During the test we found toggle switch output was not available, we continued to test further and found display selection switch was not activating sometimes. We put a tag on the remote controller and informed the warehouse to send back the remote controller and get new spare one.

Example 2:

A remote controller arrived after repair from local support of the original equipment manufacturer. We needed to test the remote controller before acceptance. The designed test rig helped to test the repaired remote controller unit without the requirement of a crane. Some of the peculiar problems we found during the test were:

- Emergency switch activated signal at receiver end but physically the emergency push button was in release condition,
- Joystick analogue signal was not linear,
- While rotating the tools selector switch, the display did not show the next selected tool but jumped to the one, which was one step further ahead,
- Communication between transmitter and receiver was interrupted in-between the test processes, etc.

The above findings will help inspecting the remote unit without crane physical requirement and test the remote unit before accepting it to stock as a spare unit.

6. Conclusion

This in-house crane remote control test rig facility is a success. It eliminated all the established issues and risks that existed previously in testing a crane remote control set. This task is now carried out in a more effective, safe and efficient way.