

Product Acceptance of a Rail Rascal

 Sam Barrett, Senior Engineer, AEGIS Certification Services, explains the Network Rail Product Acceptance Review process and how it was applied to the Rail Rascal road/rail excavator.

The Product Acceptance scheme

In the summer of 2017, Network Rail's plant team enlisted the Plant Assessment Bodies (PABs) to assist with Product Acceptance (PA). Due to the range of plant products used on the Network Rail infrastructure, the number of PA applications that the plant discipline receives exceeds the team's capacity to undertake the reviews; the PABs significantly bolster this resource.

A scheme was devised where applicants approach a PAB of their choice to undertake the PA review. Having reviewed the product, the PAB makes a recommendation to the Network Rail Head of Plant. With the majority of the review having already been carried out by the PAB, Network Rail is able to issue certificates within two weeks of receiving a recommendation from the PAB.

The scheme offers multiple benefits including significantly decreased timescales in which applications are typically progressed from initial enquiry to delivery of certificates within three months.

Where the PAB is already undertaking the Engineering Conformance (issuing a certificate of compliance with RIS-1530-PLT or RIS-1702-PLT) then efficiencies can be made in both the technical review and the need for site visits.

A further benefit is that, in ensuring an equivalent review process is undertaken by all PABs, Network Rail has provided a list of 26 requirements that the machine must comply with. This list is available to the applicant at the design stage, therefore avoiding unforeseen requirements being raised late in the product development.

In early 2018, AEGIS Certification Services (AEGIS) was accredited as a PAB, allowing the company to perform PA reviews on Network Rail's behalf with PA undertaken



on a number of machines since.

Allan J. Hargreaves Plant Engineers

Following 35 years in the plant and equipment industry, in 2018 Allan J. Hargreaves Plant Engineers (AJH Plant) began production of Road/Rail Vehicles (RRVs) with the Rail Raider excavator/crane, closely followed by the Rail Cyclone drainage/jetter unit. Following review by AEGIS, both machines were granted PA. AJH Plant was also commissioned to certify Liebherr GB machines for the UK, which brought the opportunity for AEGIS to perform the PA for the Liebherr 922 excavator/crane.

The Rail Rascal

The Rail Rascal is a smaller excavator/crane optimised for both lifting and digging

capabilities. The offset boom gives the range of motion required for trench and draining excavation whilst the GKD Rated Capacity Indicator (RCI) ensures stability and safety when lifting.

PA Review

AEGIS was contracted to carry out both the Engineering Conformance certification and the PA review. The Engineering Conformance is focused on technical compliance with RIS-1530-PLT, therefore covering the minimum safety requirements of the machine including stability, structural integrity and prevention of derailment. The PA focuses on identifying hazards from using the machine on Network Rail's infrastructure and managing the associated risks.

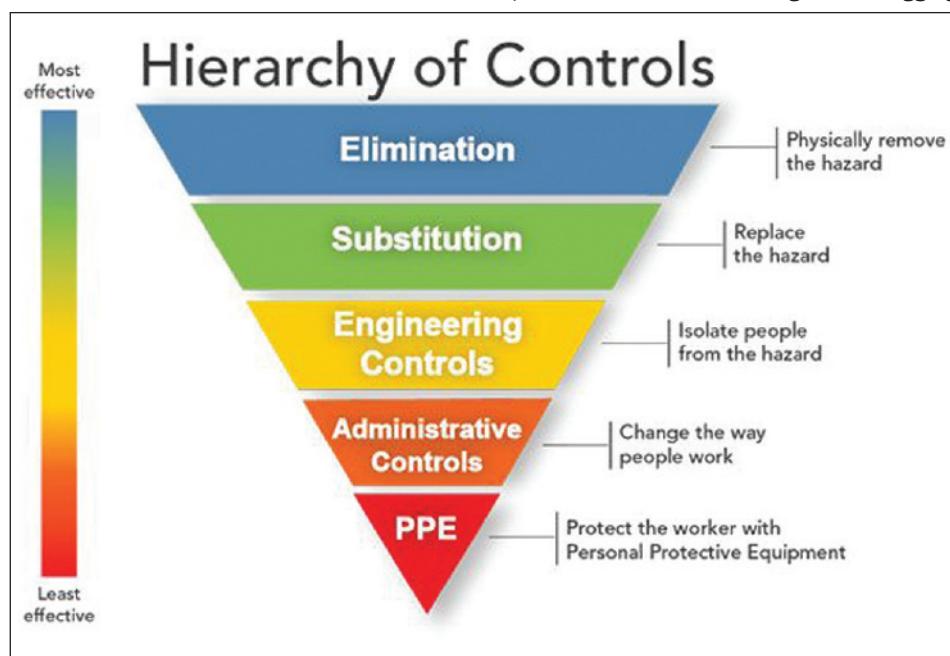
As with any machine manufacturer, AJH Plant is obliged by law, under the Machinery Directive, to identify hazards associated with the machine and eliminate or control the risk to acceptable levels.

A large part of the PA review undertaken by AEGIS is focused on ensuring that this process has been carried out robustly.

On reviewing AJH Plant's risk assessment for the product, AEGIS confirmed that a Hazard Identification had been undertaken in a structured manner, taking into account the Network Rail Hazard Prompts (a list of common hazards associated with rail plant).

The Hazard Identification had considered the entire machine's life cycle from design to disposal, with risk evaluation and acceptance undertaken using predefined criteria and definitions. Where risks had been eliminated or reduced, this had been done according to the Hierarchy of Risk controls.

The Hierarchy of Risk controls is fundamental to machine design and illustrated left. The first choice must always be to eliminate the hazard (i.e. design it out of the system). Should this not be possible,



then the hazard must be substituted for a lower risk hazard. However, if this cannot be done, then by engineering controls (e.g. interlocks, suitable guards) followed by administrative controls (instructions to operators) and, finally, reliance on PPE.

AJH Plant demonstrated application of this principle by its use of fully-enclosed guarding around rail wheels. Instead of relying on PPE (steel toe boots) or administrative controls (exclusion zones), the company engineered guards around the rail wheels to prevent operators trapping their feet between rail scrapers and rail wheels.

An important part of the review undertaken by AEGIS is where the risk cannot be controlled without administrative controls. The client safety management system must clearly identify the appropriate person and brief them accordingly i.e. if controlling a risk is reliant upon someone doing something, that person needs to be told to do it.

AEGIS was able to ensure that AJH Plant identified the person responsible for carrying out each administrative control in its risk assessment and where they are briefed about the need for the control. For example, they identified that the requirement to maintain exclusion zones is briefed to all railway staff in the Lifesaving Rules and the Plant Manual and that the requirement to measure brake force at regular intervals is briefed to maintenance staff within the machine's maintenance plan.

All machinery must be CE marked and declared by the manufacturer to be compliant with the Machinery Directive. This is a 'self-certification' process as required by law, which in other industries is often not checked by a third party. As part of PA, AEGIS confirms that the manufacturer has followed a suitable process in assuring themselves that the product complies with the Machinery Directive.

AJH Plant completed this with a clause-by-clause assessment against the applicable Harmonised Standard, EN 15746-2. AEGIS ensured AJH Plant had followed due process in this by undertaking spot checks of a small



sample of the checklist and reviewing evidence AJH Plant had applied a CE mark to the machine.

As part of the PA site visit, the applicant is required to demonstrate that the machine can be recovered off-track following a power failure. Recovering the machine into gauge is achieved using an auxiliary electric pump. To allow the machine to be towed by a rescue vehicle, both pairs of rail wheels must be disengaged from the road wheels. However, in normal operation, this is prevented by on/off-tracking interlocks. Initially, disabling the on/off-tracking interlock required an operator or fitter to go underneath the machine and make changes to the electrical circuits.

During the site visit, AJH Plant identified that this increased the amount of time taken to recover the machine and created a risk that the system would not be reverted to its correct configuration following recovery. AJH Plant redesigned the system so that the on/off-tracking interlock is overridden by the RCI override. As the RCI must be overridden to recover the machine back into gauge, this removes the need to access underneath it.

In addition, an overridden RCI is immediately obvious to an operator and

Machine Controller, so the risk of the system not being reverted to its correct configuration following recovery is significantly reduced. The event is also captured in the RCI data logger.

Because the machine is designed to undertake digging and handling, the Network Rail occupational health team requested that the protection against ballast dust be reviewed.

AEGIS applied the requirements that are contained in the Network Rail Plant Manual: any machine that has the potential to generate ballast dust must comply with the cabin filtration requirement given in EN 15746-2. As AJH Plant had generated an EN 15746-2 technical file as part of its CE marking, and already identified that the machine could be used in dusty environments, evidence was available from the OEM Komatsu to demonstrate compliance of the filtration system. It was also able to confirm that, to preserve the integrity of this system, the company had not made any new openings in the cab as part of the conversion to a RRV.

Submission and certification

Following demonstration of compliance with the 26 PA requirements, AEGIS produced a summary report and draft certificate including a recommendation for full PA. The report provided an overview of the machine, a summary of the review work undertaken and a description of the hazard identification and risk assessment processes employed by AJH Plant. On review of the report, Network Rail issued a full PA certificate for the machine.

