RISE OF THE MACHINES?

ADOPTION OF AUTOMATION TECHNOLOGY IN THE AUSTRALIAN RESOURCES INDUSTRIES AND ITS IMPLICATION FOR VOCATION AND TRAINING AND HIGHER EDUCATION

NOVEMBER 2012

The study examined the adoption of automation technology in the Australian resources sector and its implications for skill requirements and vocational education and training (VET). It investigated the adoption level and direction of automation, as well as remote control and system integration technologies in the various sectors of the Australian resources industry. Research findings assessed the current and likely future impact of the adoption of these technologies on the skills, training and higher education needs of the industry.

BACKGROUND

Australia's resources sector leads technological advancements in exploration, production, processing methods and the development and implementation of remotely controlled and automated systems in operations.

Automation can drive cost efficiencies, maximise productivity, have a positive effect on safety and reduce negative environmental impacts. For these benefits to be realised, industry needs a workforce capable of adopting and applying new technologies. This has implications for workforce structure, skills requirements, organisational structure/culture, and existing VET and higher education programs.

PROJECT FINDINGS

What is Automation

In this report automation refers to automated and remotely controlled systems as well as the application of information and communications technologies to affect integrated operations.

Adoption of Automation

The adoption of automation can improve productivity across operations and it is this benefit which primarily drives the decision to adopt automation within the Australian resources industry. Labour and capital productivity, whole-of-operation integration, optimal maintenance and scheduling, improved resource access and safety performance are some of the key benefits attractive to operating companies.

However, the level of automation and the rate at which it is integrated is likely to take time within the Australian resources setting, due to its interconnectedness with skill requirements and the structural/cultural change needed to support the automated environment and optimise its benefits.

Currently, the automation being adopted in the sector spans a broad continuum, dependent on the resources industry sub-sector and type of operation.

The oil and gas industry has seen a rapid adoption of new technology to enable entry into significantly more challenging exploration, production and processing frontiers. In comparison, within the mining industry it is the iron ore, coal and underground operations which have attracted the greatest adoption of automation.

Challenges

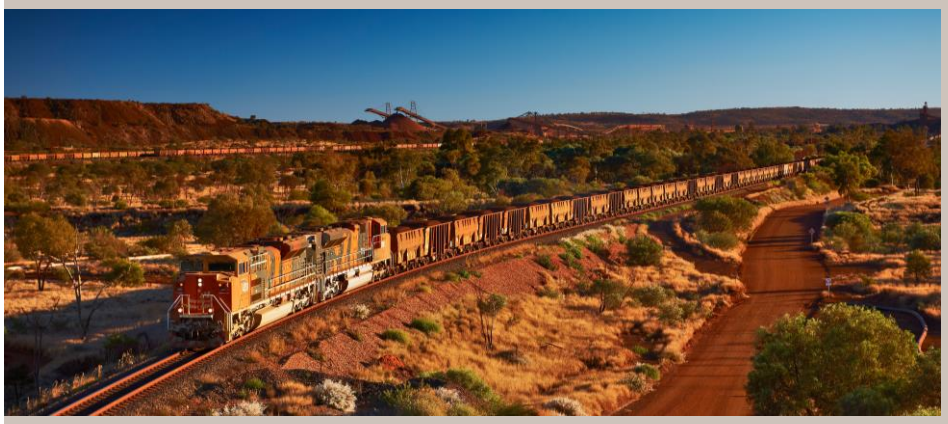
The greatest challenge, particularly for mining, is that the current workforce skill base does not support the new technologies being deployed or the integration of those technologies. This is especially so with the adoption of extensive automated systems which require higher incidence of remote control, workforce diversity and integrated, multidisciplinary, data rich problem solving.

Similarly, work patterns and the leadership model and culture of a

RESOURCES INDUSTRY TRAINING COUNCIL

appea CME

KEY ISSUES AND PRIORITY ACTIONS



typical existing resources operation is not designed to achieve the optimal benefits from the retrofitting of an integrated approach to operations management.

Workforce Structure

The precise impact of automation on workforce size and structure is not entirely clear. Although some unskilled and semi-skilled roles will phase out, there is little evidence to suggest a significant reduction in overall employee numbers. At this stage, a conventional resources operation will continue to employ tradespersons to address on-going technical, mechanical and maintenance issues.

Clearly, skill sets will change and new operational roles will emerge. Some workers will be required to operate equipment remotely and to oversee components of the automation process. There may also be an increase in the number of electrical tradespersons required on site to support change-outs, ICT systems and maintenance scheduling.

Three new roles have been identified as becoming increasingly important in the resources industry.

Automation technicians who currently are electrical tradespeople and technicians operating in other industries such as the army (for mining) and the navy (for oil and gas) that have higher level automation related skills.

Mechatronics engineers who deal with technologies directly related to the field of robotics and the application of automated and remote control systems combining electrical, mechanical, computing and software engineering to create expertise in designing, building, deploying and maintaining electromechanical devices.

Operations optimisation managers who apply expertise in logistics and process optimisation to achieve optimal whole of operations productivity benefits.

Some of the higher level skills can be accommodated by building upon the current working knowledge of some workers who are capable of this transition. One way to address this is through modifying trades training and qualifications to reflect a changing landscape.

GOING FORWARD

Implications for VET

The emerging implementation of automation places a demand for a resources automation technician qualification. There is a similar need for mechanical and electrical trade qualifications more suited to a heavy industry operating environment with current training not covering the required skill sets needed by an automation electrician within the resources industry.

Some registered training organisations are creating a qualification for an automation technician as a post trade qualification at Diploma level using a range of existing Certificate IV and Diploma qualification curricula, while some resource companies are working directly with training providers to develop automation packages for their employees.

Implications for Higher Education

The most practical pathway to develop the required automation expertise is a post-graduate qualification in mechatronic engineering for mechanical, electrical, mining or oil and gas engineering graduates.

As with VET, adapting current course materials from electrical and electronic engineering, mechanical, mining and petroleum engineering curricula may be a solution. As automation becomes more widespread, it may be possible to create an elective mechatronics steam as part of a bachelor of mining engineering programs or creating an undergraduate degree in mechatronics engineering.

Images courtesy of Rio Tinto and *BHP Billiton*

Resources Industry Training Council
Level 10, 2 Mill St Perth, WA, 6000
08 9220 8500
www.ritcwa.com.au