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Standardising Rio Tinto Iron Ore Mine Operations

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Rio Tinto Global Footprint

~52K employees 2023
Large scale operation epitomises pioneering progress

1. Drill & Blast
   - >12,000 km drilled each year
   - Equivalent to the diameter of the earth

2. Load & Haul
   - >1 billion tonnes rock moved per year
   - Enough to fill OPTUS Stadium Perth 1.5 times every day

3. Process
   - 5 gigawatt hours of electricity per day
   - Equivalent power for 500,000 Western Australians

4. Rail
   - >20,000 km rail travel per day
   - 1.2 times around Australia on Highway 1

5. Ship
   - >320 million tonnes ore shipped annually
   - Build a cone >340 metres high – same height as Uluru and 25% the volume
Iron Ore assets in Western Australia

- **Mines**: 17
- **Rail**: >1,900 km
- **Port terminals**: 4
- **Gas-fired power stations**: 4
- **Solar farm**: 1
- **Haul trucks, ~74% automated**: >400
- **Production drills, 33 automated**: ~60
- **Locomotives pulling 13,500 wagons**: 220
- **Global customers**: >100
Operation Centre Control Room

Our team provides governance and technical assurance for control systems across all sites
Mine SCADA Standardisation - Current State
RTIO standardising HMI across all mine operations by 2025

Challenge

- No overarching philosophy in HMI design resulting in varying controller response to production and safety situations.
- Controllers required to learn each sites’ standard which limited flexibility of controlling multiple sites and contributed to poor controller response times.
- Substandard or no Abnormal Situation (ASM) philosophy adopted.

Solution

- Plant SCADA chosen to be deployed across all mines and leverage the new tools available.
- Develop a central design employing elements of ASM and rule-based screen layouts.

Results

- Unified controller experience across all sites reducing variability, improving productivity and efficiency.
- Removed legacy software risks within the business.
- Controllers empowered and able to positively influence asset performance.
- Different sites able to leverage each other's knowledge of similar processes and systems.

We've been receiving positive feedback from both leadership and our operational teams regarding the Plant SCADA standardisation project. One of the highlights is that it’s bridging the training gap among the controllers. This is achieved through the cross-pollination of operating systems, fostering a more versatile and skilled workforce.

Joel Jones – Advisor Operational Readiness – Integrated Operations

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Project Timeline

**Previous State**
- West Pilbara
  - Tom Price
  - Paraburdoo
  - Mesa A
  - Mesa J
- East Pilbara
  - Hope Downs 1
  - Hope Downs 4
  - West Angelas
  - Yandi
- Greater Brockman
  - Brockman 2
  - Brockman 4
  - Nammuldi
- Karijini
  - Marandoo
- Coastal
  - East Intercourse Island
  - Parker Point
  - Cape Lambert B
  - Cape Lambert A

**Current State – Q4 2023**
- West Pilbara
  - Tom Price
  - Paraburdoo
  - Mesa A
  - Mesa J
- East Pilbara
  - Hope Downs 1
  - Hope Downs 4
  - West Angelas
  - Yandi
- Greater Brockman
  - Brockman 2
  - Brockman 4
  - Nammuldi
- Karijini
  - Gudai Darri
  - Marandoo
- Coastal
  - East Intercourse Island
  - Parker Point
  - Cape Lambert B
  - Cape Lambert A

**Future State**
- West Pilbara
  - Tom Price
  - Paraburdoo
  - Mesa A
  - Mesa J
- East Pilbara
  - Hope Downs 1
  - Hope Downs 4
  - West Angelas
  - Yandi
- Greater Brockman
  - Brockman 2
  - Brockman 4
  - Nammuldi
- Karijini
  - Gudai Darri
  - Marandoo
- Coastal
  - East Intercourse Island
  - Parker Point
  - Cape Lambert B
  - Cape Lambert A

= ASM Standards. Note: All other colours represent different versions of SCADA standards.
Provision for wet plant equipment

Detailed overview of the plant & TLO

Site equipment layout is identical for all sites
Benefits:
- Reduced navigation
- 4K screens
- Consistent layout

Top alarms, access to acknowledge multiple alarms and filtering for area

All control of equipment is consistent

Equipment Context - Alarms & Interlocks
Composites designed to give controller useful insights to make better decisions

Use of graphics instead of text to show high level detail
Standard Governance

Rio Composites and Kernel projects have been internally developed and deployed across upgraded sites

Aim:

• All shapes and graphics developed are identical across every site
• Composite configuration and user interaction with equipment is standardised
• Improvements and fixes are carefully tested prior to deploying

Why?

• Allows for improvements and fixes to be easily applied across sites
• Ensures all operations continue to adhere to the new standard
• Clear management of change process for updates and improvements
• Assists with ongoing consistent page layout and design
Composite Configuration
Port Controller Pages – Consistent Interface

- Cape Lambert A Outload
- Cape Lambert B Outload
- East Intercourse Island
- Parker Point
- Cape Lambert B Inload
- Cape Lambert A Inload
Lessons Learned

- Collaboration with AVEVA is essential
  - Getting support & raising product bugs or issues
  - Escalation of significant defects
  - Raising product feature requests
- Developing the Rio Composites library
  - Allowing for both new and legacy assets
  - Difficulty in modifying the library once deployed
  - Incorporating feedback to continuously improve the standard
  - Early stakeholder engagement
- Managing product updates for a 24/7 operation business
- Careful planning around major site upgrade works
Questions?

Please wait for the microphone.
State your name and company.

Please remember to...

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