

# B&R Enclosures



## Sustainable Manufacturing in Action

- An 18% reduction in site electricity use, saving around 80,000 kWh and \$30,000 p.a. through the installation of a more efficient punching/shearing machine.
- Labour hours freed up by up to 100 hrs/week through use of 'nesting' software allowing engineers to focus on other tasks.
- A more efficient air compressor which reduced power costs by 35%.
- Savings of \$100,000 p.a. and reduced carbon emissions through the installation of an on-site nitrogen generator.

B&R Enclosures was established in 1955 and is Australia's largest manufacturer of electric enclosures, racks and cabinets.

The company services all sectors including Telecommunications, Mining, Oil & Gas, Construction and Agriculture. B&R is made up of four divisions: B&R Industrial, B&R Data ICT, B&R Hazardous Areas and B&R Residential/Commercial.

The Australian owned company has manufacturing facilities in Brisbane, Sydney, Adelaide and China – with Brisbane being the largest. The company provides non-metallic, stainless steel, aluminium and steel enclosures of various shapes, sizes and ratings.

B&R's Brisbane facility covers 20,000 square metres and is equipped with state of the art Computer Numerical Controlled

(CNC) machines, fibre laser cutters and punching machines. B&R is currently supplying Common Network Infrastructure (CNI) for the Australian National Broadband Network.

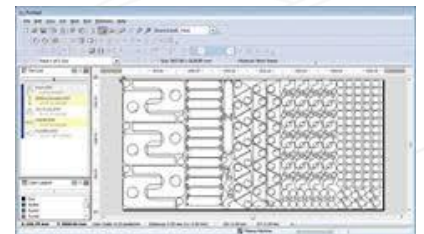
***'It is important for manufacturers to minimise their environmental footprint. There is ever-increasing knowledge and opportunity for manufacturers to do this – and it is simply good business sense'***

**Chris Bridges-Taylor,  
General Manager, B&R  
Enclosures**

## Material Inputs and Product Design

### Nesting Software

Rolled steel sheets, used to make the enclosures, are cut to varying lengths according to the type and size of enclosures to be produced. The lengths of sheet are then processed in either a laser cutter and/or punching/shearing machine to produce the various enclosure components.



B&R uses 'nesting' software which analyses the pattern dimensions of the various enclosures and uses an algorithm to determine how best to fit and cut the shapes to ensure maximum utilisation of the steel



sheet, thereby minimising waste.

The software is used on a daily basis with inputs modified according to production schedules. Typically, B&R engineers spend around 20 hours per week on nesting. In the order of 100 hours per week are saved as a result of utilising this software, allowing engineers to focus on other tasks

## Manufacturing

B&R continually look for and evaluate areas to reduce costs through more efficient use of resources.

## Energy

B&R utilise various types of CNC machines which are used to shape the metal sheets and form the electrical cabinets. A metal punching/shearing CNC machine was recently replaced with a more efficient model.

The state of the art machine is 60% more energy efficient than the previous model and includes variable speed drives and hydraulic pumps that only operate as required. Power savings are in the order of 80,000 kWh and \$30,000 p.a. and power consumption for the entire site has reduced by almost 18%.



In 2014, B&R purchased a new Fibre Laser Cutter which was the first of its kind in the country and which uses 30% of the energy of the alternative CO<sub>2</sub> laser. A second machine has since been purchased.

## Compressed air

A fixed drive air compressor, (used for providing compressed air to various equipment items), was replaced with a more efficient variable speed model which eliminated 12 kW of power draw resulting in a 35% reduction in energy costs (approximately \$15,000 p.a.) to produce the equivalent volume of compressed air.

The new machine offered vastly improved power factor (a measure of how efficiently power is used in the factory), thereby reducing electricity supply charges. It also had almost twice the capacity (150 L/s to 285 L/s) allowing for growth in production.

## Power factor correction

The company built and installed their own power factor correction unit (hardware and enclosure) which increased site power factor from around 0.8 to 0.98 saving \$25,000-\$30,000 p.a. on electricity charges. With the support of Energex funding, a 6-month payback on the investment was realised.

The improved utilisation of power supplied to the factory reduces grid electricity demand which is a benefit to the power supplier (delayed investment to improve supply capability) and an overall cost saving for B&R.

## On-site nitrogen generation

Nitrogen gas is used to cut steel in a laser cutting machine. The gas was previously supplied in compressed, bottled form by an external supplier. The installation of an onsite nitrogen generator was a more cost-effective option. Additional environmental benefits

include reduced gas losses (in storage and transfers from supplier to user and transferring the gas to a form that can be used in the laser cutter) as well as eliminating transport diesel use and carbon emissions.

The onsite generator works by filtering and purifying compressed air to produce a nitrogen rich stream (>99%). At the time of purchase, typical onsite generators produced nitrogen gas at a ratio of 7 m<sup>3</sup> of compressed air to 1 m<sup>3</sup> of nitrogen (7:1). B&R sourced a vastly more efficient generator capable of producing nitrogen at a 3:1 ratio. This resulted in savings in the order of \$100,000 p.a. in selecting the more efficient generator and transferring to on-site nitrogen generation.



## Battery life

B&R have 12 electric forklifts which are leased. A new Battery Health Monitoring system is about to be commissioned which connects the battery, forklift and operator by monitoring real-time data on the activity of each lead-acid battery. The battery amp hour throughput and run time is monitored so that operators have a clear indication of when the battery requires charging. Charge cycles are reduced by as much





as 50% which extends battery life from around 5 to 7 years, thereby reducing resources and wastes in the process of battery recycling.



### Water

Once the steel components are formed, they are powder coated to produce a high-quality rust resistant finish. This involves several stages of surface cleaning and preparation requiring the use of alkali and acid chemicals, town water and more highly treated reverse osmosis (RO) water.

The powder coating process was optimised to reduce water consumption by increasing the level of recirculation of initial rinse water (town water) and reducing the once-through final rinse water (RO water). This process reduced annual water consumption by around 24% saving 2.4 ML and \$12,000 per year and additional energy related savings in producing RO treated water.

### Future Projects

B&R are currently evaluating savings on undertaking a complete lighting retrofit of high bay metal halide and fluorescent tubes to more efficient options.

They are also investigating the installation of a Building Management System to control the office air conditioning and

factory lighting.

The installation of solar PV is also under review and would reduce peak demand or general grid energy requirement.

Along with a list of future projects, B&R General Manager, Chris Bridges-Taylor, views the digital economy as an enormous opportunity to improve productivity and make strategic business decisions through having access to real time data.

### Partnerships

B&R Enclosures stays abreast with developments in manufacturing via involvement with the Queensland Manufacturing Institute (QMI).

They also provide the opportunity for engineering students to develop their capability via industry-based projects as part of the Co-operative Education for Enterprise Development (CEED) program.

B&R are looking forward to further developing links and working on strategic projects with CSIRO and The University of Queensland's Centre for Advanced Materials Processing and Manufacturing (AMPAM).



This case study has been prepared by The Ecoefficiency Group Pty Ltd for the Queensland Department of State Development in 2017.