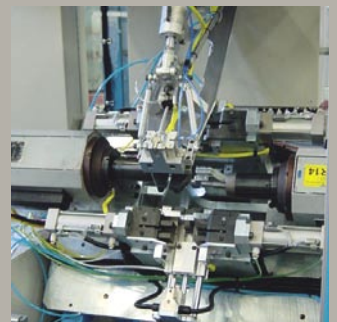


# BROOK ENGINEERING



Brook Engineering Pty Ltd  
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## Capability Statement

### General

Brook Engineering Pty Ltd is a diversified and experienced Adelaide based engineering mechanical and control systems (Mechatronics) design and manufacturing company.

### Services

Over the past 14 years, Brook Engineering, with over 25 university, technical or trade qualified staff, has developed capabilities in the project management, design, manufacture, development and commissioning of 'turn key' special purpose machines. These machines invariably involve the integration of mechanical, hydraulic, pneumatic, electrical and electronic systems. Other capabilities include consulting services, product design, design and manufacture of plastic injection and blow moulds, press tools, general tooling, jigs and fixtures and precision component manufacture.

### Industries

Machines and other equipment built over this period are used in a diverse range of industries such as automotive, defence, electronics, building, civil, environmental, medical, food and wine.

### Approach

Brook Engineering provides a fully integrated and flexible design and manufacturing capability. The integrated disciplines and facilities allow the fast tracking of projects with close control of progress and quality. A collaborative design process using design reviews with the customer ensures the end requirements are met.

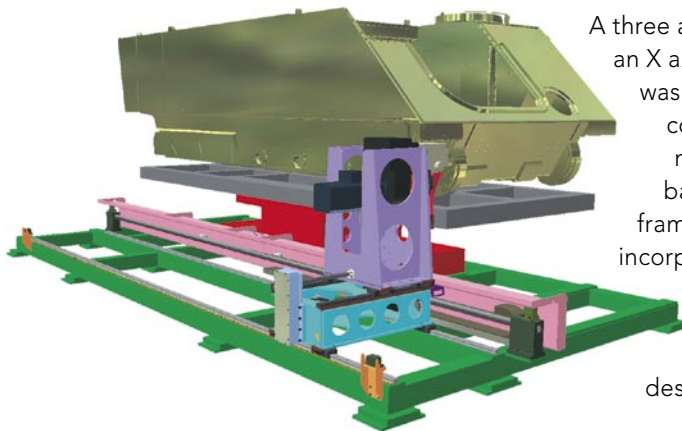
### OLIVE OIL BENCHTOP SAMPLING MACHINE

A system comprising three machines, a hammer mill, a malaxer and a centrifuge to produce oil from up to 800 grams of olives was designed, manufactured and commissioned. Raw olives are fed into the hammer mill hopper and milled into a pomace. The pomace and associated canister are then transferred to the dual water-bath heated malaxer for mixing. The canister is then transferred to the centrifuge and spun to release the oil. The oil is drawn from the outlet closure in the canister, for measuring, testing and tasting.



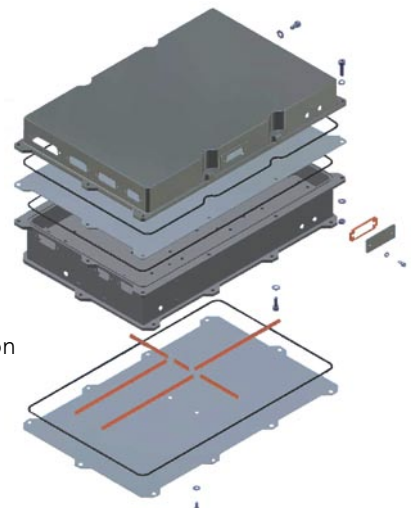
### TENIX LAND DIVISION: CNC EXTENDED AXIS MILLING MACHINE

A three axis CNC milling machine with an X axis travel of over 5 metres was designed, manufactured and commissioned. Included in the machine are linear bearing slides, ball screw axis drives, machine frames and guarding. The machine incorporates a commercial CNC controller and servo motors for the spindle and three axis drives with purpose designed machining programs.



### VIPAC : FEDSAT ELECTRONIC HOUSINGS

In conjunction with Vipac and their partners, the Institute for Telecommunications Research (ITR), layouts and detailed drawings were produced to house the UHF and Baseband Processor communications payload developed and built by ITR for the FEDSAT satellite. A light weight, high-rigidity housing with good thermal dissipation, and specified RF isolation was designed using space flight suitable materials, electronic connectors and components. To meet the critical environment, vibration and thermal performance criteria, the interactive design process required considerable collaboration between the companies involved.



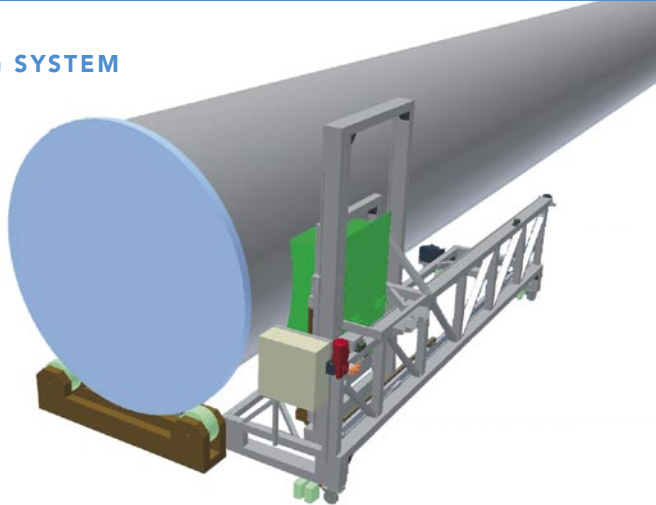


## AHT : ZINC SPRAY TRAVERSING SYSTEM FOR WIND FARM TOWERS

A PLC controlled traversing system was designed, manufactured and commissioned in accordance with customer requirements to zinc spray wind generator towers.

The towers are made in three sections, about 20 metres long and up to 4 metres in diameter. For corrosion protection the steel towers are grit blasted, zinc sprayed and painted in quick succession.

The task was to mount two of the zinc spraying guns in a fume/dust extraction enclosure and traverse these back and forth along the axis of the tower as it is slowly rotated. The travel of the sprayer system is over 4 metres and the towers are sprayed in sections at a time. The unique control system is integrated with the equipment used to rotate the towers so that the zinc spray is uniformly applied with considerable cost saving for the customer.



## Management and Computing Systems

The Brook Engineering computing facilities and machines are integrated through a high speed network system. Purpose designed, comprehensive, job based business management software is used, integrated with other software such as Microsoft Access, Outlook and Project.

## Design Facilities

Mechanical design 3D solid and surface modelling software facilities include 5 seats of ACAD Inventor/ Mechanical Desktop, 2 seats of IDEAS and 3 of ACAD LT.

## Workshop Facilities

A well equipped manufacturing plant includes Deckel Maho and Quantum CNC machining centres and a CNC tool room lathe. CNC tool path generation is achieved using Machining Strategist and Powermill software. Other equipment includes precision mills, lathes, EDM's, grinding, metal cutting, welding and painting.

## Contact Brook Engineering

Please contact Brook Engineering Pty Ltd for consultation and a quotation for your project whether it be research and development, special purpose machine, product design, control system, tooling, or precision manufacture. Our team of people with experience in mechanical systems, control systems, project management, design, manufacture, development and commissioning, can assist you to achieve your project goals. No job is too insignificant!

## AIR INTERNATIONAL : STEERING COLUMN BURNISHING MACHINE

A PLC controlled machine which burnishes together machined and moulded parts in telescopic automotive steering columns was designed, manufactured and commissioned. The column shafts are splined to transmit steering torque and a plastic compound is injection moulded into an annulus in the splines. This restricts angular play, which creates parts that are initially too tight to slide. The burnishing machine reciprocates the parts to 'wear' them in and then applies grease to prevent further wear in use. Each machine stroke is monitored by a load cell and when the required force is reached grease is applied.

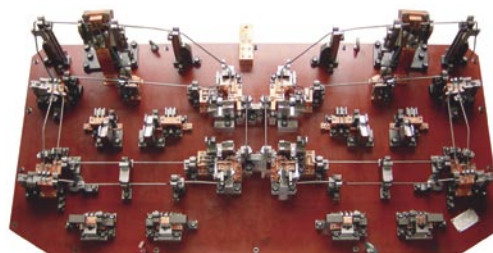
The machine incorporates sensors to automatically adapt to different telescopic column designs and is designed to work at high speed to meet cycle time requirements.



## AIR INTERNATIONAL: SEAT BACK CUSHION WIRE, WELD JIGS

A series of jigs were designed and manufactured for the assembly and projection welding of wire frames for automotive Seat Backs and Cushions.

The jigs integrate with robotic welding cells and have numerous sensors for automatic wire placement detection. Pneumatic clamping of some sections and ejection of parts on each jig station are provided. The jigs required close tolerance and location specifications and all location points in contact with the wires are insulated from the base. All electrode points are connected to a common copper base for weld electrical circuit completion.

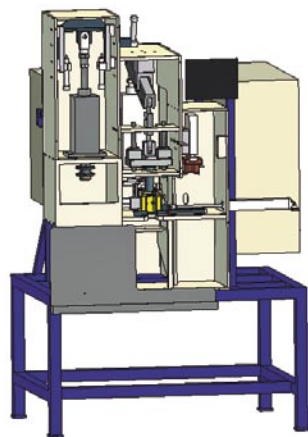
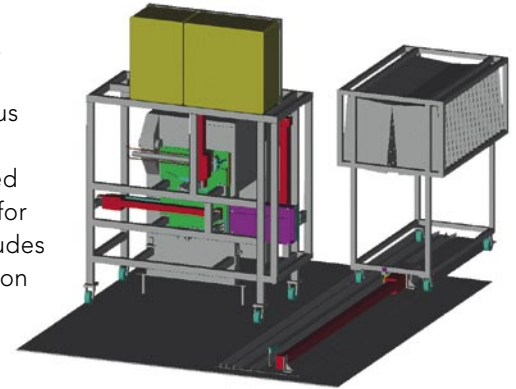


## Examples of Successfully Completed Projects:

- > Automatic metal spraying machine for large wind power generation structures;
- > Housings for satellite electronic equipment;
- > Specific purpose CNC milling machine for the defence industry;
- > Olive processing machine to produce samples of oil for testing, incorporating a hammer mill, malaxer and centrifuge;
- > Fast conveying and stacking machines for the food and wine industries;
- > Automated assembly machines for manufacturing industries;
- > Synthetic wine closure bevelling machine;
- > Automotive steering column spline burnishing machine;
- > Tube bending and forming machines;
- > Seat wire frame projection welding machine for automotive seating;
- > Large volume edible nut roasting equipment;
- > Automotive steering column to footplate assembly machine;
- > Orbital riveting machines;
- > Hose orbital grinding machines;
- > Parts washing, cleaning and swarf removal machines;
- > Machine for sheet metal roll forming and notching;
- > Fungicide spraying equipment;
- > High pressure leak decay and vacuum testing equipment;
- > Medical containers;
- > Plastic injection and blow moulding dies;
- > Retro-fitting machine tools with control systems;
- > Gauges, jigs and fixtures;
- > Machine safety guarding;
- > 40 tonne hydraulic press;

## SCHOLLE : RIB STACKING MACHINE

A PLC controlled stacking machine for thin ribbed plastic strips nominally 300mm long was designed, manufactured and commissioned. The machine receives strips chopped to length from a continuous extruder at nominally 130 parts per minute, stacks them then loads the stacks into magazines mounted on trolleys. The magazines hold about 3800 strips for the next manufacturing process. The machine includes a two stage accumulator, stack transfer and elevation system, stack insertion to the magazine and an indexing system for the trolleys to align the magazine compartments correctly during transfer.



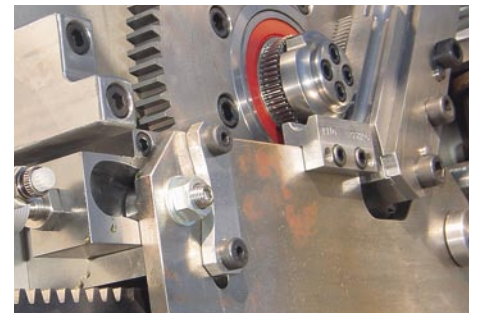
## AIR INTERNATIONAL: FOOTPLATE AND STEERING SHAFT ASSEMBLY MACHINE

A three station PLC controlled assembly machine for the partial assembly of steering column units was designed, manufactured and commissioned. Station 1 press assembles a sealed bearing into the rubber moulded footplate, a mounting pad for the column to the car firewall, using a controlled spray of water as a lubricant. Station 2 presses the footplate onto the universal joint shaft to a preset position with a load cell continuous force monitor, the push-on rate being controlled by an adjustable hydraulic damper. The part is then automatically transferred to station 3 for assembly of a plastic cover.

The machine is pneumatically operated with sensors to detect the presence and correct orientation of components prior to assembly. Operator interface is via a touchscreen for all automatic and manual operations. Assembly values and setting variables are set via the touchscreen.

## COOPER STANDARD: TUBE BENDER

A PLC controlled power bender to complete a 180deg bend in a steel tubing production part from a 90deg CNC bend was designed, manufactured and commissioned. Prior to the 180deg bend the part is plated, a flexible hose and other parts are assembled. A split form die, fully supporting the tube to prevent collapse, with both halves moving is provided for ease of loading and unloading with rigid high force clamping during the bending process.



A pneumatically driven rack turns a pinion, with the tooling mounted directly on the pinion to maximise rigidity and strength. This unique design uses a second rack and pinion to ensure the pressure die 'rolls' around the periphery with no slippage; which together with highly polished contact surfaces, preserves the part surface finish.