for GCD because it enables us to have more control over quality," Tony Blaubaum, the firm's general manager told *Engineers Australia*.

He said the idea is to do as much work as possible in Australia so that on-site work can be kept to a minimum.

The firm also uses an innovative approach for working with clients and other contractors – it draws up its plans and schematics in different colored inks coded so that the responsibility of a particular party matches one of the colors.

"This way we overcome communication problems where language differences can easily create misunderstandings," he said. "With this method it is obvious to all parties what their responsibilities are the moment they look at the plans."

He said this approach has worked well in China. But he believes the

On-site work kept to a minimum

most important thing is to be visible on site and to be prepared to take an interest in the client's people and their culture.

"Our engineers have been well accepted and have been invited to all sorts of family and village ceremonies. This doesn't happen if you sit in an office in town and turn up on site occasionally."

Blaubaum, a chemical engineer with an MBA, has worked in many countries and believes Australian engineers are ideally suited to working in developing countries because they tend to be less specialised and more broadly educated than their European and US counterparts and they tend to be more resourceful.

GCD International manufacturing and office establishment is located in Knoxfield in Melbourne's east. When *Engineers Australia* recently visited the site a number of ovens and manufacturing modules were being built. The largest module recently exported was 20m long, 4m high, 3.5m wide and weighed 60t. The substantial engineering and drafting office contains seven AutoCad 12 stations as well as traditional drafting equipment.

Engineering design is the central focus of the firm with engineers and technical people comprising 50% of its staff of 80. ❑

Innovative air heat exchanger receives energy award

by Bob Jackson

Cogeneration expert Bill Ellul of Ecopower Pty Ltd in Melbourne recently outlined the operation of an innovative waste heat recovery unit at the International Symposium on Energy, Environment and Economics conference at Melbourne University.

Earlier last year Ellul completed the design and installation of the unit using an innovative rotary air-to-air heat exchanger at Jac Australia's adhesive label paper manufacturing plant at Tottenham in Melbourne. The success of the installation resulted in Ecopower receiving a 1995 Australian Energy Award from The Energy Magazine, an independent Melbourne-based publication.

The unit recovers waste heat from the exhaust of an industrial drier used in the adhesive labelling manufacturing process. It uses the heat saved to preheat fresh air delivered to the drier thus saving on the natural gas used to operate the drier plant.

Bill Ellul holds his energy award

The heat exchanger, manufactured by Rotary Heat Exchangers Pty Ltd of Bayswater, uses a high-temperature resistant Kapton plastic film spirally wound around an aluminium hub. Channel section alumium spokes extend from the hub and contain 1mm thick spacers which separate the plastic film to form a wheel matrix of narrow parallel passages for gas flow and heat transfer.

"This optimises the high heat transfer and low pressure drop characteristics of the unit, forming a very efficient, low pressure drop compact design," Ellul told *Engineers Australia*.

The transfer of heat from the exhaust is indirect so that incoming air cannot be contaminated with exhaust gases. This is achieved by purging with fresh air before it enters the heated fresh air side of the plastic wheel matrix. The wheel is located inside an insulated plenum chamber which separates the exhaust from the heated fresh air to the drier.

Clearance and rubbing seals are used to minimise leakage of exhaust gas into the fresh air stream. The carryover of exhaust gas into the fresh air stream is kept to a minimum by the low rotational speed of the wheel. A small variable speed AC electric motor is used to drive the kapton heat wheel and a small fresh air fan is used to blow fresh air into the fresh air side of the wheel and to assist the larger drier exhaust fan which provides most of the driving force for exhaust gas and fresh air flow to the system.

Ellul said he was originally involved in the design of the heat generator, also referred to as a novel rotary air heater or sensible heat regenerator, in the 1970s when he was working with CSIRO. Initially it was used for low temperature air-conditioning applications, but the version at JAC Australia has to cope with exhaust temperatures of up to 300°C.

Ellul said that in air-conditioning applications the energy saving is minimal because temperatures typically range from about 20°C to 40°C ambient.

The heat transfer capability of the kapton heat wheel is controlled by its speed which ranges from 2r/min to 20r/min. At the slower speed it transfers less heat resulting in higher flue exit temperatures. At the higher speeds it transfers more heat resulting in lower flue exit temperatures. If the wheel is run too fast, the lower flue temperatures can cause condensation in the flue thus causing harmful corrosion.

He said the wheel speed is therefore controlled so that the flue exit temperature is maintained above the vapor dew point temperature.

"The dew point temperature limits will also depend on the particular vapors in the stream which vary depending on the particular drying run." ❑