

PROCESS ENGINEERING

The expertise and experience of TSV engineers extend to a variety of applications, as these examples illustrate.

TSV are consulting mechanical engineers providing a wide range of engineering design and analytical services, ranging from specialised rollover protective structures to process engineering solutions.



SALT-SPRAY TESTING FACILITY



In order to develop an independent testing capability as well as provide "on-demand"

testing facilities with the required flexibility, a three chamber salt-spray (corrosion testing) facility was designed, constructed and commissioned to perform corrosion testing on various automotive components to the various recognised international standards.

It enabled programming to all the required parameters as outlined by the various standards and was accordingly calibrated by comparative testing.

The project was implemented as a new design project where a complete brief was prepared isolating customer and product requirements with the corresponding conceptual drawings, calculations and complete costing as well as an overall project plan.

Due to customer quality system requirements, processes such as Failure Mode Effect Analysis (FMEA) were used to determine causes, effects and planned actions to combat quality issues during construction as well as regular production performance. All the required details were contained and explained in a suitably drafted user manual detailing critical areas concerned with use and maintenance.

As part of internal and customer quality requirements, the system was accepted based on the results of comparative product testing over a range of parameters.

Effect Analysis (FMEA) were utilised to determine causes, effects and planned actions to combat quality issues.

Each scenario was estimated along with anticipated costs and timing. A complication was the implementation of an essentially non-standard process, which required it to be treated as a development project, involving the preparation and interpretation of experimental and empirical data.

The system was successfully modified to accept the new adhesive system with some minor reductions in process performance compared with the original adhesive system due to the differences in nature of the two adhesives.

TUBE-COATING LINE



Isolating a need to become an industry leader in brazed aluminium heat-exchangers, a

high-speed tube-coating line was designed and commissioned to apply adhesive and aluminium powder (forming the melt material during brazing) to aluminium heat-exchanger tubes. This process was implemented prior to the core assembly process.

Further process development and international hazardous process chemical restrictions required a process and machine modification to accommodate a revised adhesive. A redesign on the application (spraying) of the adhesive as well as the drying process was required. The development process was easily accommodated by the fully P.L.C. controlled machine.

The modification was effected as a new design project where a complete brief was prepared isolating the various aspects requiring modification along with the corresponding process and product implications. Due to customer quality system requirements, processes such as Failure Mode

BULK MATERIALS HANDLING



Due to process trimming in a paper mill, there was a requirement to manipulate paper off-cuts. Previously the

continuous off-cut was simply discharged into a hopper bin and wheeled to the re-pulping unit. The process was labour intensive and made complicated where the hopper-bins were exchanged.

It was therefore recommended to pneumatically convey the continuous off-cut through a chopper-fan (cutting the continuous off-cut generated by the trimming process) via suitable ducting and diverter valves to the re-pulping unit. The diverter valves allowed the off-cuts to be sent to various parts of the process as elected by production staff. Control of the process is via P.L.C.

This new process eliminated the manual handling of hopper bins and feeding of the re-pulping unit as well as the process in general thereby contributing to the efficiency of the process.

Computer aided design and engineering

TSV brings to bear the powerful combination of AutoCad, 3D solid modelling and Finite Element Analysis (FEA). FEA saves time and money, reduces risk, and optimises performance of parts and assemblies. Prototyping is minimised, materials and weight are optimised, performance is predicted. Rapid analysis and revision turns days of hand calculation into hours, hours into minutes - and all with vastly greater accuracy.