

## Company profile

2000t force T1 automated press at Stadco's new facility in Telford

Stadco, UK's largest independent supplier of automotive body-in-white pressings, celebrated the opening of its fifth UK production site located in a former Japanese owned pressworks – refurbishing the factory buildings, services and two press lines in just three months following an upturn in premium car production in UK.



# Stadco – A return to output for automotive pressings

STADCO celebrated the official opening of its fifth UK production site at Telford on 14th July 2011. This event is significant, not only because it illustrates a resurgence in demand from UK automobile producers, but also because of the remarkable speed in which Stadco management responded to the returning market following the precipitous fall at the beginning of 2009 when car manufactures across the western world interrupted production in response to the falling demand for vehicles.

Stadco took over a derelict works in Telford, in the west Midlands of UK on 5th of February 2011 and made its first test pressing on 11 April – just nine weeks later. By May, the site was supplying pressings to customers.

Ramp up of the number of pressings reached 200 000 completed by July with a target of 950 000 in total by the end of the year, this is about 50% of Telford's capacity with two lines in operation.

The 18 acre site was previously occupied by the Japanese tool company, Ogihara, who acquired it from Venture Pressings in 1993, the former joint venture company owned by GKN and Jaguar Motors established in 1988 to supply pressings to Jaguar.

Ogihara operated five fully automated pressing lines on the site, adding a second building and Toolroom in 2001. But when business stalled in 2009 they rapidly closed the site and stripped out three of the press lines for shipment to the Far East.

Ogihara were within weeks of removing the two remaining lines when Stadco made a successful bid for the site and its contents. Thus Stadco became the owner of two modern fully automated press lines: a 4.5m bed 2000t four stand line and a 3.5m bed 1600t five stand line, housed in two separate buildings as well as 24 000m<sup>2</sup> of covered space vacated by the three lines removed and, ready for future expansion with cellars and foundations in place. Also included on the site is a fully equipped toolroom for die production.

The acquisition of the freehold site was made and the buildings refurbished without the aid of any development grants such as the need to

get the plant up and running to meet the resurging demand for pressings.

50 die sets were resourced to produce the pressings currently in demand, 31 of which were new to Stadco. 19 die sets were allocated to Stadco's other production sites in UK to balance production across the group.

### Customer base

Stadco is a Tier 1 supplier to the automotive industry. Customers include Jaguar Landrover, Ford, BMW, Vauxhall, GM, Nissan, Toyota, Honda and others as well as earthmover producer JCB and Massey Ferguson tractors.

It produces some 70 million pressings a year for the body in white (BIW) ranging from small simple brackets to large body panels and closure panels in both steel and aluminium.

It processes some 50kt/y of steel sourced mainly from Tata Steel Europe (former Corus), ArcelorMittal Auto Processors and Steel and Alloy in Grades: DX51 through to DX56, (low C (0.1 – 0.005%C) HDG steels of increasing formability), DC03, DC04 (C 0.03-0.06%) and Bake Hardenables (H180 to H300) steels.

It also processes 11kt/y of aluminium supplied by Novelis and Aleris in Al-Mg 5000, 6000 series alloy.

Most of the material is supplied as ready cut

blanks from Service Centres but Stadco's Castle Bromwich plant can handle coil and has blanking lines.

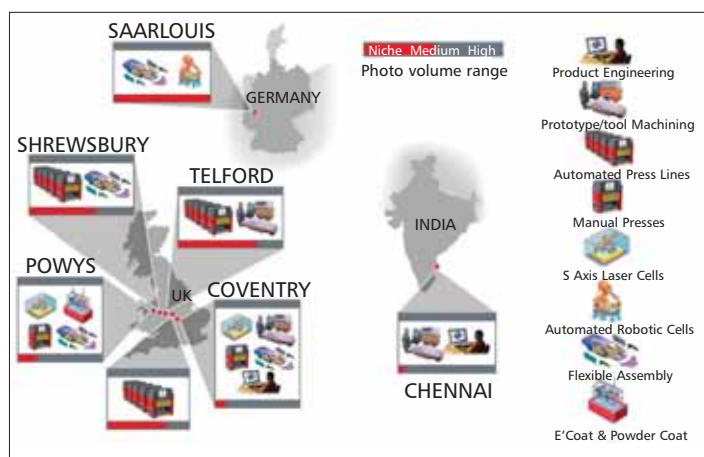
The company also produces sub assemblies from its pressing, for which there is a growing demand as automobile manufacturers wish to increase flexibility to produce model variants in shorter runs.

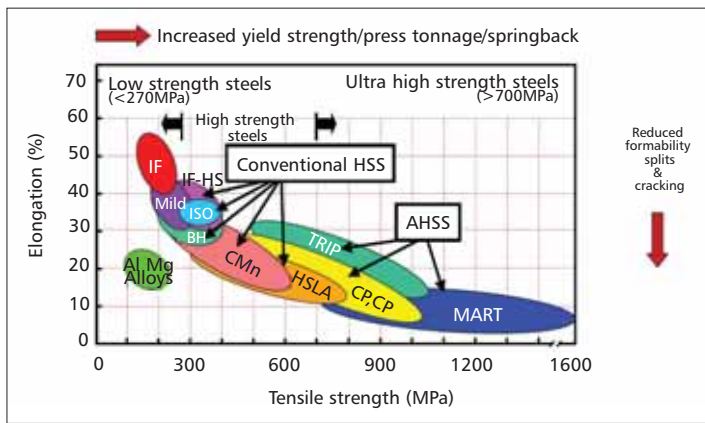
### Stadco group

Although Stadco can trace its history back almost 200 years, its career in stamping started in the early 1960s when it started manufacture of the first press tools for the European automobile industry.

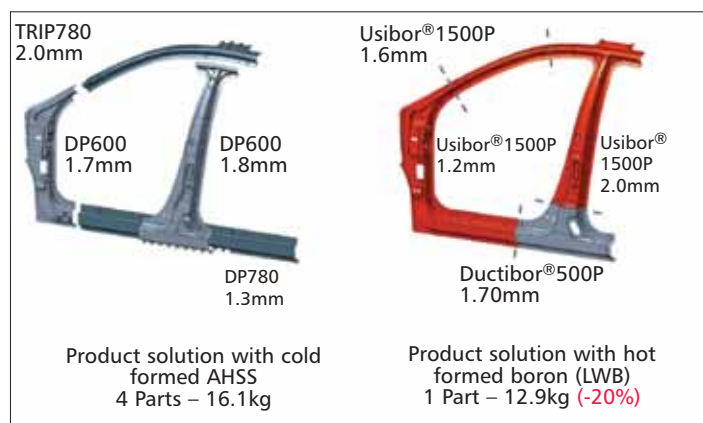
In 1971 the company formed the Shrewsbury Tool and Die Company (Stadco) and installed 16 power presses in Shrewsbury to supply motor body panels to Ford Europe. In 1998 it expanded by acquiring plants in Tipton, West Midlands, and Powys, North Wales. Following a management buy-out in 1999, in 2000 it set up a JV pressing plant in Brazil and in 2001 a JV with Jaguar to produce aluminium pressings at Castle Bromwich, UK. In 2002 this plant was reintegrated into Jaguar. 2003 saw the acquisition of Saarlouis in Germany to supply the Ford plant there. In 2004, Stadco acquired Mayflower Vehicle Systems with its two pressing shops at Coventry and Castle Bromwich. It

Fig 1 Location of Stadco plants and design centre in India





**Fig 2** Forming properties of traditional automotive steels, high strength steels (HSS) and advanced high strength steels (AHSS) and Al-Mg alloys



**Fig 3** Weight saving achievable using a boron AHSS steel over a duplex phase HSS Source ArcelorMittal

also acquired Parker Tools that year. In 2005 it started offering engineering solutions to India and in 2008 set up a design centre in Chennai.

In 2011 it bought a partly dismantled press shop in Telford which had been shut for over a year, refurbished it in record time and started production in May.

Stadco's headquarters are based in Shrewsbury to the west of Telford. Group turnover for 2011 is presently forecast at €215M – a record for the company and €100M higher than in 2009.

It now has manufacturing plants in Shrewsbury, Castle Bromwich, Coventry, Powys (Wales) and now Telford having divested itself of some of its earlier acquisitions. All are located in a line from Coventry in the east to Powys to the west in North Wales and are conveniently located for the West Midlands with its central supply routes (Fig 1).

As well as producing pressings in bulk, Stadco also undertakes product engineering, prototype production and manufacture of sub assemblies. Facilities to achieve this within UK include a total of 10 automatic press lines as well as three manual press lines, tool machining, 5-axis laser cutting cells; automated robotic cells, flexible assembly cells and e-coating and powder coating.

**Shrewsbury plant**

The Shrewsbury plant is a medium to high volume pressings producer and manufacturer of sub assemblies. It currently employs 450, the number growing from a low of 228 in 2009 when 40% of the labour force across the group was laid off and the remaining workforce were on short time. Over 41 million pressings are produced each year.

It operates Progression presses, 3 x 144" Auto press lines, 3 x 108" press lines, and 1 x 84" press line. It has numerous automated and manual assembly facilities.

New business in 2010 includes: Vauxhall Astra wheelhouses; Jaguar XF rails; the new Jaguar XK closure pressings and GM/Nissan/Renault van structural assemblies.

**Castle Bromwich plant**

The Castle Bromwich plant produced volume pressings and closure assemblies. It now employs 72 from a low point of 19 in 2009.

The site was extended by 2300m<sup>2</sup> in 2010. It has a 5m, 2500t automated press line as well as automated closure assembly cells.

Recent new business is production of the

Range Rover Sport tailgate and Jaguar XK closures.

**Powys plant**

The Powys plant in North Wales specialises in lower volume OEM production and aftermarket 'one stop shop'. It has 149 employees from a low point of 52 in 2009.

It has 2 108" and 1x96" manual press lines as well as laser cutting, electro-coating of modest sized parts and powder coating.

For assembly it can carry out press 'hemming' and robot closure 'hemming'.

New business in 2010 includes GM Astra stampings, Landrover Defender pick-up bed and rear door and for the Landrover Freelander Service.

**Coventry plant**

The plant at Coventry is the prototype and product engineering centre for Stadco. It has 2 hydraulic 4m presses, 6 presses between 96" and 126", laser cutting, a 5 axis CNC machining centre, prototyping paint facilities and manual weld and assembly operations.

New business in 2010 includes prototype programmes, work for the new Landrover Range Rover, the new Jaguar X152 and the Jaguar XF Sportbrake.

**Telford plant**

The newly acquired Telford plant is a high volume pressings facility. Presently it employs 54 permanent staff. It commenced serial supply on 3rd May 2011 just 12 weeks after being acquired with buildings in a dilapidated state and services to the two remaining press lines having to be reinstated – including the complete scrap handling system on one line.

It has two large automated press lines; 1x 4.5m bed 2000t Fukui MFC 2000-300 and 1x 3.5m bed 1600t Hitachi Zasen Fukui housed in two separate buildings with 24 000m<sup>2</sup> of available covered space for future expansion.

**International**

Stadco's subsidiary company in Germany at Saarlois exclusively supplies the Ford plant there ('over the wall') with 130 different sub assemblies for five assembly lines. Daily production is around 80 000 units.

It employs a workforce of 350 and uses 280 assembly robots (visit [www.stadco-saarlois.de/index.php?id=83&lang\\_id=en\\_GB](http://www.stadco-saarlois.de/index.php?id=83&lang_id=en_GB) for a video of operations).

Stadco's design centre in Chennai, India;

Stadco Automotive Pvt, was established in 2008 to offer engineering services, BIW prototyping and BIW manufacture through a phased move into the Indian market. The Technical Centre supports both international OEMs and domestic Indian automotive manufacturers.

**Quality control**

Each European site has TS16949, ISO 14001 and Ford Q1 accreditation.

All UK sites run a Lean Manufacturing plan owned by the plant manager.

Employees from across the business are involved in cross functional teams to deliver improvement programmes by:

- 5S workplace management;
- Waste reduction;
- Visual Factory; and
- Value Stream Mapping (VSM).

Business improvement includes Lean Apprenticeships with four recruits this year and two last year and 300 employees will be trained through an adult apprenticeship scheme in Business Improvement in 2011 to 2013, each course lasting three months.

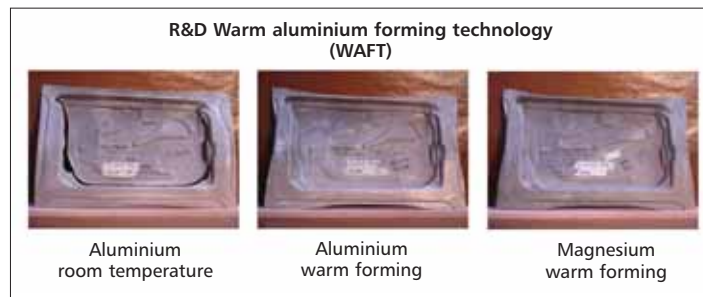
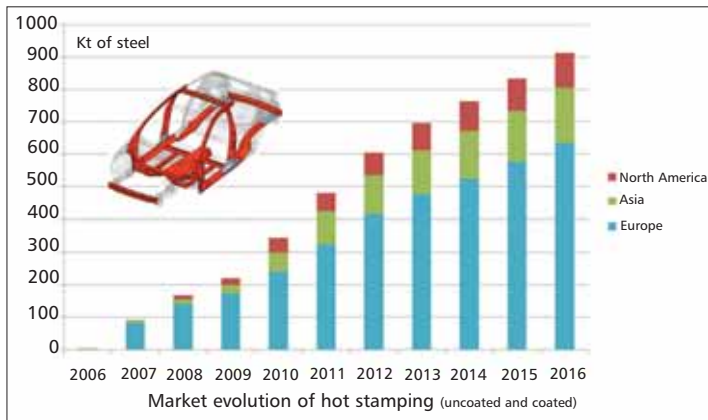
**Developments in lightweighting**

To meet the current demand to lightweight the BIW to reduce fuel consumption and hence CO<sub>2</sub> emissions, steels of increasing strength but reduced thickness are being used by automotive manufacturers.

Fig 2 illustrates the strength and ductility of the range of steels currently available to the automotive manufacturer and also the common 5000-6000 Al-Mg alloys employed. While low strength and high ductility materials are easiest to form, lightweighting increasingly demands the use of high strength steels (HSS) or even advanced high strength steels (AHSS) or aluminium alloys which are increasingly difficult to press without failure or spring back.

The strength of the Al-Mg alloys matches those of the low carbon and interstitial free steels employed in the past, but the ductility of these alloys is half that of these steels preventing the production of deep drawn shapes as a single pressing thereby requiring the joining of several partial pressings with its associated additional costs and weight penalty.

Additionally, high strength steels (HSS) and advanced high strength steels (AHSS) are increasingly being put to use, at least in European vehicles, because of the weight saving they offer by enabling thinner gauge materi-



**Fig 4 Europe leads in the use of hot stamped AHSS**  
Source ArcelorMittal

**Fig 5 Warm forming technology can produce a successful pressing in aluminium (centre) or magnesium (right) where room temperature pressing fails**

al to be used. **Fig 3** illustrates a 20% saving in weight in a door frame achieved by using an AHSS containing boron compared with a dual phase HSS steel. However, the boron steel has to be hot stamped at around 600°C to overcome its high strength and lower ductility which not only requires additional cost and complexity to heat the blanks but also additional cooling to cool the press dies.

**Fig 4** illustrates the growing use of hot stamping in Europe, a trend far less evident in USA and Asia.

An alternative approach to reduce weight is to use aluminium which has approximately one-third the density of steel but it has to be in thicker gauges than steel to compensate for its lower strength. Also, to achieve similar formability as steel, like boron steels it has to be stamped at elevated temperature if deep drawn pressings are to be produced in a single operation. Warm aluminium forming technology (WAFT) presses at a temperature of around 300°C which reduces the heating costs and die cooling problems associated with hot pressing boron steel. Under these conditions, deep drawn pressings can be made which would fail at room temperature. Magnesium sheet can also be warm formed offering even greater weight savings over aluminium as its density is 37% less (1.7g/cm<sup>3</sup> compared with 2.7g/cm<sup>3</sup> for Al) and its hexagonal crystal structure enables greater through thickness strength to be developed by control of grain orientation during sheet manufacture. **Fig 5** illustrates the advan-

tages of warm forming of aluminium and magnesium sheet, the latter recently being employed in niche applications.

Because of their focus on supplying the premium end of the automotive market Stadco expects to see an increase in the number of pressings in aluminium they produce to rise from 15% at present to 50% by 2014 and 70% by 2018. They do not, however, believe the same trend will necessarily be followed in the mass production automotive market.

Lightweighting is not only applied to the pressings but to the dies themselves thereby reducing the energy requirements to operate the press. Such an example is a 44% reduction in die weight from 126t for five dies to 69.6t using only four dies of modified design for the production of a tailgate with no change in the design of the final pressing.

Stadco have not seen a great penetration of tailor welded blanks into pressings as yet or hydroforming of sheet, although hydroforming of tube is increasingly applied to none BIW structures such as engine cradles. A project conducted by Stadco investigating hydroforming of sheet found the method less cost competitive than conventional pressing.

On joining technology, Stadco is supporting research into remote fibre laser welding (RFLW) which enables a high intensity laser beam to be focused onto the joint at a distance of a metre or more away. This greatly increases the speed of welding a seam. This technique is applied to overlap welding – as is conventional

spot welding – with linear laser welds of a few centimetres each produced at regular intervals. Not only does RFLW enable much faster operation than spot welding it also only requires access to one side of the assembly. A study to compare the technology with spot welding to produce bodyside inners found RFLW required 80% fewer robots, took 50% less floor area and used 25% less tooling. An overall saving of 34% in the cost of welding resulted. In addition, when used to weld aluminium, the problem associated with oxidation of electrodes used for spot welding is avoided. One draw back, however, is the need for precise spacing between the overlapped sheets but this can be achieved by pressing spacer dimples onto the area of the overlap during pressing.

Dermot Sterne, MD of Stadco sees the automotive BIW as its sole market after considering alternative white goods and electronic goods pressing during the lean time of 2009. The rapid pick-up of automotive production in UK, in particular in the premium vehicle market, means the company had to expand its operations to meet demand. 90% of its output goes direct to UK based car manufacturers either as pressings or sub assemblies. ■

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