

Tip of the Iceberg

As demonstrated on the Edbro stand at Tip-Ex 2012, tipping vehicles come in all shapes and sizes. Peter Smith, sales and marketing director with Edbro, explains why so many design options are available.

To the untrained eye, tipping vehicles may seem to be a fairly simple affair; a body is built to transport a load and a tipping cylinder is attached to eject the contents at the journey's end. However, everyone in the industry knows that haulage is a numbers game. Increased payloads and tipping cycles translate directly to increased profits, which is why Edbro work with some of the biggest body builders in the UK to develop bespoke tipping solutions that are tailored to the exact requirements of each vehicle's application.

Understanding the haulage requirements of a vehicle is essential to body builders when designing a tipper. If a vehicle will be hauling one material through its life it is possible to design the body to maximize payload, reducing weight to ensure that the maximum safe load can be carried. A vehicle that will carry varied materials needs to be designed for all possibilities; this may reduce payload but will increase its flexibility.

The frequency of tipping must also be considered. A vehicle that will be travelling many hundreds of miles between tips would benefit more from lightweight tipping gear, while a vehicle that will tip many times a day within a short radius would favour a fast-acting and robust solution.

Of the many vehicles that were on display at Tip-Ex, all be broken down into one of two main categories: aluminium bodied or steel bodied. Both body types offer distinct benefits to the customer, so it is important to be sure which is required at the beginning of the specification.

An aluminium body offers improved weight saving over a steel body while still ensuring high levels of torsional stiffness and maximum stability. Vehicles that will be hauling bulk materials such as sand or fine aggregates will benefit from increased payloads which can equal many thousands of pounds in increased profit each year.

Like many body builders, Wilcox Commercial Vehicles Ltd specialize in the construction of lightweight aluminium bodies, manufacturing a number of designs for both rigid trucks and tipping trailers. Sales and engineering director Chris Bartlett estimates that for every 100kg saved, nearly £5,000 of extra profit can be generated over a vehicle's lifetime.

However, where aluminium offers weight savings, steel can offer savings on



Tipping cylinder design has evolved greatly over the years

unnecessary repair and maintenance bills in tougher applications. While steel is heavier it is also a lot stronger and more resistant to wear, making it longer-lasting in industries with particularly abrasive materials. If a vehicle is likely to be subjected to high-impact loading, for example during muck-

away operations, then steel is more suitable.

The overall size and design of the tipper body is also critical in ensuring that it increases full-life profits. Applications where dense materials are being moved are not likely to require large trailers, as they could never be completely filled due to the excessive



A 'smoothsider' tipper body

weight involved and would also increase fuel use unnecessarily. It is also possible to reduce the drag of a tipper through advanced aerodynamic designs; however, this would only tend to be used on a vehicle that made frequent long journeys.

SDC Trailers Ltd, one of the largest trailer manufacturers in the UK, produce aerodynamic, 'smoothsiders' which reduce wind resistance. Designed for transporting less aggressive aggregates, the chassis is inclined to ease tipping and lightweight aluminium extruded side panels are used to reduce drag. This design produces a significant fuel saving over more traditional ribbed designs over long distances, but would be impractical and costly if shifting earth from one area of a work site to another.

One design criteria that is also heavily dependent on the material that will be hauled is the angle to which the body must be tipped in order to ensure that the full load is adequately ejected. Accurately calculating the ideal tipping angle allows the correct specification of cylinder, which, in turn, reduces the tipping cycle time and the hydraulic equipment weight. Edbro offer a tipping angle guide to help hauliers when specifying new tippers, and the company's expert team is always happy to discuss specific applications with customers and recommend the lightest safe solution. Most tippers are built to provide a tipping angle of 45-50° with little thought for dedicated operations moving just one material type. Easy-to-tip materials such as coke, ash and cinders are generally ejected at an angle of less than 35°, whereas extremely compact excavated earth will need an angle of at least 50°.

As with tipper bodies, the design of tipping cylinders has evolved greatly over the years to provide a variety of options, each of which offers its own unique benefit. Rigid truck users who opt for lightweight bodies can further reduce weight by opting for lightweight

hydraulics. Developed specifically for the UK market by a British company with UK design and manufacturing facilities, the Edbro CX14 is the lightest 8x4 gear available at just 477kg for the full kit, inclusive of oil. The CX14 offers customers a substantial increase in payload, boasting a saving of up to 230kg against competitors. In monetary terms, for most operators that would provide an additional income of more than £1,200 per year.

Alternatively, operators looking for a very high-lift capacity and fast-acting solution may opt for a TS32. This style of twin-cylinder under-body tipping gear comes into its own in heavy off-road tipping, where uneven ground is a factor, due to the stabilizing benefit of the high-tensile steel frame.

Having specified a tipping body and the tipping gear, there are several useful accessories that can be added to the tipper which are designed to enhance safety and/or improve operation. Load-weighing systems are able to accurately measure the weight of a truck's contents to ensure every kilogramme of potential payload is reached with every load transferred. Equally, inclinometers and overhead-voltage sensors are available to reduce the likelihood of tippers overturning on uneven ground or hitting overhead power cables.

As with the rest of the specification process, the advantages of each option should be weighed up against the possible negative consequences. If a vehicle will regularly pick up its load from a yard it is worth considering that most facilities now operate highly accurate weighing systems which would render an on-board weighing system largely redundant. On-board weighing systems clearly offer many operators advantages in legal compliance but they reduce the maximum legal payload and increase the build cost of



The Edbro CX14 lightweight tipping cylinder

the vehicle. Equally, tipper safety equipment only needs to be specified when there are likely to be real hazards to be avoided in a vehicle's operations.

Over the years a wealth of design ingenuity has been invested in improving tipping technology to produce profitable vehicles which are tuned for many different industries. This article merely scratches at the surface of the ways in which different load requirements or tipping frequencies could affect the specification process. To find solutions tailored to readers' specific application requirements, it is always best to speak to one of the UK's many expert body building firms, in conjunction with Edbro – the only British cylinder manufacturer. ➤

Edbro's inclinometer is designed to enhance tipper safety



Aggregate Industries opt for lightweight tipping gear



Aggregate Industries are to fit Edbro's lightweight CX14 tipping gear to their new rigid tipping vehicles. Offering a weight saving of up to 230kg against comparable cylinders, it is estimated that Aggregate Industries will generate up to £8,000 in extra payload per vehicle.

'We regularly update our fleet and always have two key priorities in mind,' commented Jeff Stobbart, national logistics manager for Aggregate Industries. 'First, we make sure that any equipment we install conforms to our strict safety standards; and secondly, we seek to maximize each vehicle's payload.'

'Edbro understand our market and work with us to push the boundaries on safe and efficient weight saving. Their cylinders have stood the test of time, and their 'fit and forget' policy is exactly what we are looking for in our equipment.'

The CX14 was launched two years ago as the latest product in Edbro's weight-saving CX series of combined ram and tank units. The kit is said to offer a 60kg weight saving against the market leading CX15 and a saving of 230kg against direct competitors.

Danny Broomfield, UK business development manager for Edbro, commented: 'Ever since the launch of the CX14 we have had a fantastic response. Existing customers are choosing to use the CX14 where suitable, and new customers are asking us to supply their fleets. It's a massive boost to know that Aggregate Industries trust our equipment on all their new vehicles.'

Edbro introduce strongest ever hydraulic tipping cylinder



At this year's International Automobil-Ausstellung (IAA) show in Hanover, Germany, Edbro unveiled their largest and strongest hydraulic tipping cylinder to date, the CS22, which features a load capacity of 90 tonnes.

Recent investment in its UK manufacturing facilities has helped the company develop the latest CS22 cylinder within the CS range. In addition, a new laser welding machine, which is said to be the most powerful ever built for tubular welding, allows Edbro to weld larger diameters and thicker wall sections, giving the cylinder the strength it needs to tip up to 90 tonnes.

The CS22 cylinder is specifically designed with precision heavy-duty engineering to ensure maximum operational reliability in tough working environments. Its robust design is specially adapted for markets where overload conditions are commonplace, with thicker tube walls providing high buckling loads to improve safety during operation.

Other features that the CS22 shares with the rest of the CS range include: double-lip wiper seals that provide efficient lubrication and prevent cylinder contamination; wear rings made of non-metallic, acetal material, to reduce friction and extend service life; and brass sliders which reduce the risk of scoring and damage from side loads. As with all Edbro cylinders, the CS22 has been designed to be bio-oil compatible, to help operators reduce their environmental impact.

Peter Smith, sales and marketing director for Edbro, commented: 'We pride ourselves on developing strong and reliable cylinders, and our CS22 product represents the

Taking the 'green' route with Edbro



Edbro already manufacture some of the lightest, like-for-like, tipping cylinders on the market, thereby improving a vehicle's fuel efficiency greatly, but now the company has announced that all of its hydraulic kits are bio-oil compatible too, offering further potential savings.

Traditionally, hydraulic tippers have required non-renewable mineral oil to provide the pressure that operates the linear movement of cylinders. A tipping vehicle that is used frequently throughout the day will need regular oil changes, which can be costly both in terms of new oil and disposal of the used product.

Aware of the increasing pressures on fleet managers and owners to develop environmentally aware operational strategies, Edbro have ensured that all their hydraulic kits can be operated equally well on bio-oils. Made from vegetable oils and animal fats, the use of bio-oil as a sustainable alternative to traditional mineral oil is growing in popularity across the world. Over time, bio-oils are likely to become cheaper to source than mineral oils, as well as being safer to handle and transport, and easier to dispose of when it becomes necessary to change the oil.

Edbro sales and marketing director Peter Smith said: 'We understand the pressure on businesses to improve their environmental credentials. That's why we have worked hard to ensure that our cylinders are the lightest and quickest on the market; and it is for this reason that our hydraulic kits have now been developed to be bio-oil compatible.'

pinnacle of hydraulic cylinder design with strength and reliability being the primary focus. The quick-tipping capability of the CS range allows operators to reduce their tipping cycle time, resulting in more cycles per day and boosting operational time. We have used advanced manufacturing techniques, such as laser welding, to ensure our products are built to the highest quality possible.'

For further information visit: www.edbro.co.uk