



FAG

INMOTION

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Wave Power Breakthrough



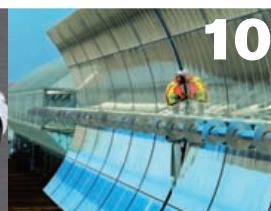
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INMOTION

POSITIVE CONTRIBUTIONS TO THE FUTURE



It gives me great pleasure to welcome you to the latest issue of our corporate newsletter. The Schaeffler Group has always championed

quality and innovation - not just of products but of services too - and I am pleased that so many of the articles in this issue bear strong testament to this.

With recent high profile developments in renewable energy technology here in the UK, it is pleasing to feature the positive contribution that the Schaeffler Group is making to the future sustainability of our planet, not just in the wind, wave and tidal energy sectors, but in the automotive industry too. Bearing technology has always been a major contributor towards energy efficiency, which has been further enhanced in recent years by Schaeffler's introduction of the class-leading X-life product portfolio.

Without doubt, a major factor in our success over the years has been the dedication, loyalty and commitment of our people, and I am really pleased that this has also been recognised externally by several accreditation bodies, not to mention Her Majesty the Queen!

I would welcome your feedback on any of the stories you read in this issue and would like to take this opportunity to thank you for your continued interest and loyalty towards the Schaeffler Group in what are still very difficult economic trading conditions.

Kate Hartigan
Managing Director

NATIONAL TRAINING AWARD FOR LLANELLI

SCHAEFFLER'S AUTOMOTIVE COMPONENT MANUFACTURING PLANT IN LLANELLI HAS BEEN AWARDED A WALES TRAINING AWARD IN RECOGNITION OF THE COMPANY'S EXCELLENCE IN TRAINING, PEOPLE DEVELOPMENT AND ORGANISATIONAL CHANGE.

Its success came in the 'Partnership and Collaboration' category of the National Training Awards (NTA).

The award was given in recognition of the plant's working partnership with Brilliant Minds Training & Development, a company that specialises in behaviour and attitude change in business.

The award was accepted on behalf of Schaeffler UK by Managing Director Kate Hartigan, Director of Human Resources Adrian Roberts and Training Officer Donna Williams-Bevan.

Schaeffler and Brilliant Minds together were one of 15 finalists from Wales, shortlisted from more than 800 NTA entries. The NTAs are designed to recognise organisations and individuals that demonstrate outstanding business and personal success through investment in training. By recognising best practice, the awards aim to raise awareness and inspire others to invest in learning and development.

Working together, Schaeffler and Brilliant Minds adopted a technique known as Neuro-Linguistic Programming (NLP) in order to increase the flexibility of both the mindset and behaviour of management at the Llanelli plant.

This involved focusing on overcoming obstacles to learning, promoting effective communication throughout the company and by encouraging employees to become more self-aware.

Roger Evans, Plant Director, commented: "We recognised that our style of management and the



happiness of staff were fundamental to the overall success of the plant. Adopting the NLP programme with the help of Brilliant Minds has encouraged an increase in emotional resilience.

"Although there have been some significant problems to face during the last 18 months, people here now seem more able to deal with these issues and are less likely to become stressed because of them.

"There have also been numerous examples of managers engaging in more detailed, productive conversations with staff, either to explain changes or to better understand issues that need solving," he added.

Dianne Lowther, Principal Trainer for Brilliant Minds, said: "What makes this programme exceptional is the commitment of Schaeffler's directors and senior managers to the development of staff as well as their own development. Many Schaeffler people undertook 15 days of training over a 12 month period and, despite the downturn in business from the automotive sector, the company has seen a tangible improvement in business performance".

Investing in the development and skills of its people has always been a high priority for Schaeffler UK. Since the culture change programme was introduced to Llanelli in 2001, the plant has made significant improvements, even through the current economic recession. Almost every operator has now achieved NVQ Level II in Performing Manufacturing Operations. Many have also requested to proceed to NVQ Level III and all employees at the plant have now undergone training in 5S Workplace Organisation. There are currently seven engineering apprentices and two graduate trainees at the plant.

The Prince of Wales with members of the Welsh Automotive Forum including Roger Evans (centre).

PRINCE IS BRIEFED ON WALES' GREEN AUTOMOTIVE AGENDA



Schaeffler UK is a member of the Welsh Automotive Forum's Low Carbon Vehicle Cluster (LCVC) and, as a result, Roger Evans, Plant Director at Llanelli, was amongst the group that briefed HRH The Prince of Wales about the Wales Green Automotive Agenda during a recent visit to South Wales.

Set up in January 2010, the LCVC currently has 22 member companies that have agreed to share skills, experiences and resources in order to help each other address specific technical, manufacturing and marketing issues. Member companies will observe and adopt best practices from other members that will lead to improved processes and systems.

Tim Williams, Chief Executive of the Welsh Automotive Forum said that the

briefing for The Prince of Wales was organised during his recent visit to South Wales so he could learn about the Wales Green Automotive Agenda and the Low Carbon Vehicle Cluster. "His Royal Highness was very interested in both the Green Automotive Agenda and LCVC and has asked to be kept up to date on future progress."

Roger Evans, who is a board member of the Welsh Automotive Forum, commented: "The Low Carbon Vehicle Cluster is about member organizations sharing business contacts in order to create brand new business opportunities.

"As a company Schaeffler is actively seeking and submitting collaborative R&D and commercial projects that can generate sustainable wealth for contributing members."

SCHAEFFLER CEO TAKES THE REINS AT WORLD BEARING ASSOCIATION



Dr. Juergen M. Geissinger, Schaeffler Group President and CEO, was elected as president of the World Bearing Association (WBA)

at the organisation's fourth annual meeting in Tokyo.

The WBA was established in 2006 as the umbrella organisation for the American Bearing Manufacturers' Association (ABMA), the Japan Bearing Industrial Association (JBIA) and the European Bearing Manufacturers' Association (FEBMA).

It represents the leading global bearing suppliers, with combined sales of approximately 20 billion euros, or around 75 per cent of the worldwide rolling bearing market.

Its objectives include the elimination of competition-distorting trade restraints, as

well as the introduction of uniform environmental protection standards.

Another important focus is the fight against product piracy and counterfeiting. "Counterfeiting earns large sums of money and causes immense economic damage," commented Dr. Geissinger.

The bearing industry is not immune to counterfeiting and reports losses of several hundred million euros. Counterfeit bearings are also a considerable safety risk and the situation has deteriorated over the last few years, as the counterfeiters copy not only simple catalogue products, but also technologically demanding bearings that are, for example, used in aircraft engines or high-speed trains.

"WBA therefore intends to further reinforce its initiatives with intensified information and clarification of facts for customers on the one hand and uncompromising prosecution of offenders on the other," said Dr. Geissinger.

Other members of LCVC include Connaught Engineering Ltd, a developer of hybrid drive technologies, aluminium castings supplier Melloy Ltd, and the University of Glamorgan's Faculty of Advanced Technology.

Tim Williams, added: "The Cluster is open to any company in Wales that can demonstrate that they have developed or are manufacturing low carbon vehicle or infrastructure technologies, or that they have adopted low carbon technologies in order to reduce manufacturing carbon emissions."

MBE FOR ROGER EVANS



Roger Evans, Plant Director at Llanelli, has been awarded an MBE (Membership of the Order of the British Empire) for his services to the engineering industry in Wales.

As well as successfully managing the day-to-day operations of Schaeffler UK's manufacturing plant in Llanelli since 2001, Roger has been instrumental in formulating and driving forward a manufacturing strategy in Wales.

He is currently Chairman of the Welsh Manufacturing Forum, an organisation that reports directly to the Welsh Assembly on manufacturing strategies for Wales. He is also Director of the Welsh Automotive Forum and Director of the Wales Management Council. Roger also sits on the Board of Governors for both EEF (Engineering Employers Federation) South West and EEF Wales.

"I am truly honoured to receive such an award and must now continue to work hard in supporting Welsh engineering and manufacturing companies," he said

"One of my key objectives has been to try to enthuse and encourage more young people in Wales to choose engineering as a profession. We need young, enthusiastic people involved in engineering if the UK is to survive as a manufacturing nation."

A DECADE OF EYE ROLLING

AFTER MORE THAN 10 YEARS OF OPERATION, SPHERICAL ROLLER AND SPHERICAL PLAIN BEARINGS FROM THE SCHAEFFLER GROUP ARE CONTINUING TO ENSURE THAT THE LONDON EYE KEEPS TURNING SAFELY AND RELIABLY.

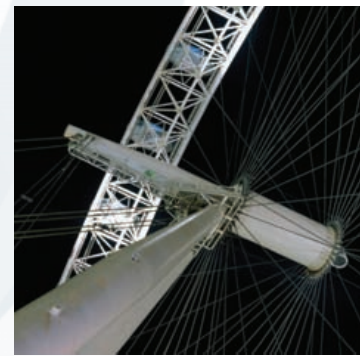
The Millennium Wheel has been rotating continuously, day after day, for 10 years and is now one of the most popular visitor attractions in London. Since opening, the total number of passengers to have used the observation wheel is more than 36 million.

At the centre of the wheel are FAG rolling bearings, originally supplied by Schaeffler in 1999/2000. The wheel, which was constructed using around 1,500 tonnes of steel, rotates with the help of two FAG double row, radial spherical roller bearings, which are fitted as a locating and non-locating bearing set at the hub of the wheel.

Firmly located on the shaft, the locating bearing has an outside diameter of 2.66m and weighs 6.3 tonnes. The non-locating bearing, which has an outside diameter of 2.62m and weighs 5.2 tonnes, moves back and forth on the shaft in order to compensate for thermal expansion. These two spherical roller bearings have a rated life of more than 50 years.

Experienced engineers from FAG Industrial Services carry out regular inspections to ensure defect-free, reliable functioning of the bearings.

If at any point during the Wheel's lifetime, the bearings require dismantling, Schaeffler has devised a novel, cost effective, time-saving solution. As the non-locating bearing has a larger bore (2.1m) than the locating bearing (2.04m), it can be pulled over the locating bearing seat, enabling both bearings to be



dismantled from one side. Dismounting would be carried out on the river side, as the observation wheel only has a support on the land side.

As well as supplying bearings for the central hub, Schaeffler also provided large ELGES spherical plain bearings that hold the London Eye in an upright position. During the original installation of the wheel, these spherical plain bearings enabled the wheel to be moved from its horizontal mounting position across the Thames and into its final vertical position. Since installation, the function of the bearings has been to compensate for micro-movements caused by the wind.



efficiency and correct functioning of drive systems and other important machine components.

FIAT CONTRACT IS A MAJOR BOOST FOR LLANELLI PLANT



SCHAEFFLER UK'S AUTOMOTIVE MANUFACTURING PLANT AT LLANELLI IN WALES HAS RECEIVED A SIGNIFICANT ORDER FOR THE SUPPLY OF MECHANICAL TAPPETS FROM ITALIAN CAR GIANT FIAT.

This is the first time that Schaeffler's UK plant has worked with Fiat and the order is for the production of 11 million mechanical tappets per year.

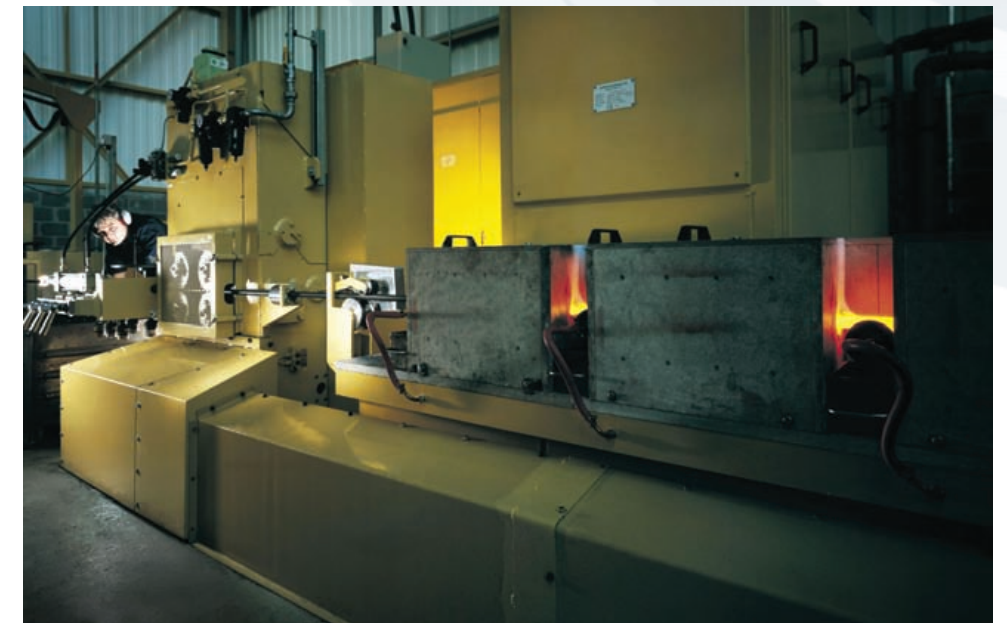
Roger Evans, Plant Director, commented: "This contract is a significant achievement for the plant and further demonstrates the high levels of quality and service that we are providing to customers. It also represents a further vote of confidence from the Schaeffler Group in our abilities to manufacture tappets for worldwide consumption and shows that in these troubled economic times, UK manufacturing can still prosper against lower labour cost economies."

Schaeffler supplies Fiat assembly plants in Italy and Brazil with top shim mechanical tappets for Fiat's 'FIRE' type engine, having invested significant time and money in new production machinery in order to meet this opportunity.

"Shortly after starting production, Fiat came to Schaeffler and asked if we could support them by ramping up to almost double the volume of tappets planned at the start of the project," said Richard Hall, General Manager,

Commercial for Schaeffler UK's Automotive Division. "The team at Schaeffler UK was committed to helping Fiat and,

through the flexibility and determination of everyone involved, we were able to satisfy Fiat's request within a matter of weeks."



SCHAEFFLER UK RECOGNISED FOR QUALITY EXCELLENCE

SCHAEFFLER (UK) LTD'S AUTOMOTIVE COMPONENT MANUFACTURING PLANT IN SOUTH WALES HAS RECEIVED A WALES QUALITY AWARD FOR THE PLANT'S ACHIEVEMENTS IN MANUFACTURING QUALITY.



The Wales Quality Awards is an annual competition based on the EFQM European Excellence Model. The awards are open to all companies based in Wales, including manufacturers, financial organisations, service providers, hospitals, educational establishments and local councils.

Schaeffler UK received top honours in the Manufacturing Prize category. Donna Williams-Bevan, Training Officer at Schaeffler UK, and Process Manager Derrick Lewis, accepted the award on behalf of the company at the annual awards ceremony held at the City Hall, Cardiff.

Winning a Wales Quality Award is an accolade for any business and many organisations that take

part do so year after year, as they use the process as a fundamental part of their company's planning process to drive business improvement.

Vincent Kane, Chairman of the Wales Quality Centre, the organisation responsible for the Wales Quality Awards, commented: "I think the Schaeffler plant at Llanelli is now a role model in Wales of what a medium-sized manufacturing plant should be. Areas of excellence include leadership and constancy of purpose, as well as people development and involvement."

"Schaeffler has shrugged off the difficult times which the automotive sector has endured during the recession, and I believe the plant is now in a strong position for the recovery."

NEW LARGE SIZE BEARINGS COMPENDIUM NOW AVAILABLE

A new, 1100-page, technical compendium on large size bearings is now available from Schaeffler (UK) Ltd.

The new book (Catalogue GL1) provides OEMs, distributors and end users with a comprehensive overview of the Schaeffler range of large size bearings for heavy machinery and equipment.

The compendium provides technical information on more than 10,000 bearings under the INA and FAG brands with outside diameters (OD) up to 2,800mm. It is a valuable complement to Schaeffler's existing rolling bearings catalogue (HR1), which details rolling bearings up to 1,300mm OD.

The new compendium also details useful bearing accessories, special rolling bearings, spherical plain bearings and bearing housings.

When it comes to large size bearings, Schaeffler offers considerable expertise and technical guidance. For many years, the company's INA and FAG branded large size bearings have been the preferred choice for heavy industry applications, including steel, paper, mining and mineral processing, industrial power transmission, wind turbines, rail, production machinery and the energy sector.

In most of these industries, large size bearings are critical in ensuring the high reliability, energy

HYBRID DEMONSTRATION VEHICLE

SHOWCASING SCHAEFFLER'S E-MOBILITY CAPABILITIES

THE SCHAEFFLER GROUP IS CONTINUING ITS DRIVE TOWARDS DEVELOPING GREENER AUTOMOTIVE TECHNOLOGIES WITH THE INTRODUCTION OF ITS NEW HYBRID DEMONSTRATION VEHICLE, THE SCHAEFFLER HYBRID.

Based on the Vauxhall Corsa, this fully operational hybrid vehicle is part of an advanced development project at Schaeffler that enables practical comparisons to be made of a number of different vehicle configurations and driving conditions. As well as using a conventional volume-manufactured combustion engine, the Schaeffler Hybrid incorporates a central electric motor and two wheel hub motors. The vehicle incorporates every Schaeffler brand, including INA, FAG, LuK, IDAM and AFT.

"Being able to demonstrate and compare the various concepts of conventional and electric or hybrid vehicles played a decisive role in implementing the Schaeffler Hybrid," explained Dr. Peter Gutzmer, Member of the Executive Management Board responsible for technical development at the Schaeffler Group.

"Each of the various elements can be switched on or off to simulate a wide range of different driving conditions. These options range from classic operation using a

combustion engine, through to parallel hybrid or serial hybrid operation, or on an electric motor-only basis."

The combustion engine can power the vehicle and be coupled for use as a range extender. An automated manual transmission, incorporating LuK clutch products, increases the options available. The energy store, a 16 kWh lithium-ion battery (400 V, 400 A), is charged using energy recovery methods, via a range extender and an external power supply (plug-in hybrid).

The vehicle's central unit is connected to the automated manual transmission using a toothed chain that drives the front wheels. This unit comprises a liquid-cooled, 50kW, 95Nm electric motor, which was designed and manufactured by IDAM (INA Drives & Mechatronics).

The wheel hub motors, also developed by Schaeffler, have an output of around 50kW each and an impressive torque output of approximately 530Nm. During the design and manufacture of these high performance components, Schaeffler was able to draw on

its in-house expertise in wheel bearings and direct drive technologies. The wheel hub motors each form a compact unit that integrates a wheel bearing, drive and brake. The advantage of these drive units is the fact that they can be integrated in an existing vehicle platform without making any major changes to the vehicle architecture. They also offer incredibly low noise levels.

"The Schaeffler Hybrid will not go into volume production," says Peter Gutzmer. "Rather it serves as a vehicle of ideas. The Schaeffler Hybrid demonstrates that the Schaeffler Group takes a holistic approach to mobility and now offers innovative products for e-mobility solutions in its portfolio."

In addition to the components used in the Schaeffler Hybrid, Schaeffler's range of products tailored to the needs of hybrid vehicles and electric mobility includes hybrid clutches (used in high end hybrid SUVs), electromechanical chassis and steering components, as well as various differentials including a lightweight, space-saving differential with face spline and electric differentials.

WORKING WITH PORSCHE

NEW CONCEPT CUTS FUEL CONSUMPTION AND CO₂ EMISSIONS BY 10%

CO₂NCEPT-10%, THE RESULT OF A POWERTRAIN FRICTION REDUCTION DEVELOPMENT PROJECT BETWEEN THE SCHAEFFLER GROUP AND PORSCHE HAS ACHIEVED AN OVERALL 10 PER CENT REDUCTION IN FUEL CONSUMPTION AND CO₂ EMISSIONS IN A DEMONSTRATION VEHICLE BASED ON A PORSCHE CAYENNE WITH A V8 ENGINE.

The development project has involved the use of novel, optimised engine components, which when combined, achieve an overall 10 per cent reduction in fuel consumption and CO₂ emissions.

In addition to tried and tested, optimised engine components, the vehicle is also equipped with several new powertrain and chassis components supplied by Schaeffler. These components help to significantly reduce the car's fuel consumption compared to existing production models.

In the joint development project, Schaeffler was responsible for the design and testing of components, while Porsche managed system co-ordination and validation for the entire vehicle.

The reductions in fuel consumption and CO₂ emissions were initially verified theoretically through complex simulation calculations at Schaeffler, and then practically via extensive bench testing at Porsche. The calculation standard used was the Standardised New European Driving Cycle (NEDC).

The engine accounts for 5.8% of the optimised fuel consumption and associated CO₂ emissions. Most of this (4.1%) comes from modification of the VarioCam Plus valve

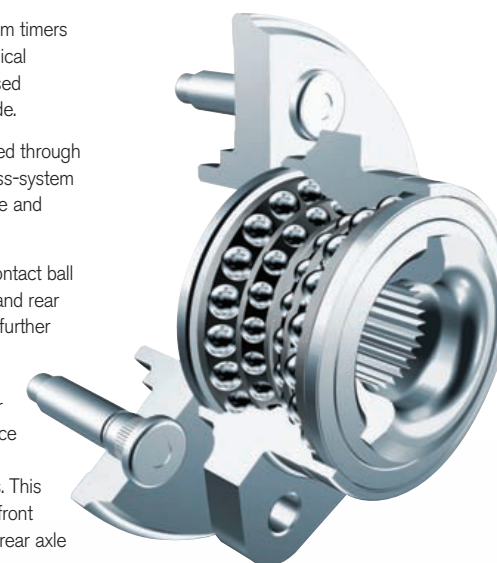
control system, where hydraulic cam timers were replaced with electromechanical equivalents, and the use of optimised switching tappets on the intake side.

An extra 1.7% reduction is achieved through minimising frictional losses, by cross-system optimisation of valve train, belt drive and chain drive components.

Schaeffler's double row angular contact ball bearings are installed in the front and rear axle differentials and generated a further 1.1% in fuel savings. These TwinTandem bearings, which replaced the existing tapered roller bearings, reduce frictional resistance significantly when compared to conventional transmission systems. This reduction amounts to 35% in the front axle transmission and 42% in the rear axle transmission.

Fuel consumption is also reduced via the chassis. By replacing the hydraulic roll stabiliser with an electromechanically controlled equivalent and using smooth running wheel bearings, a 3.2% reduction in fuel consumption is achieved.

"As is the case with cam timers, electrically-operated components make such an important contribution because they only



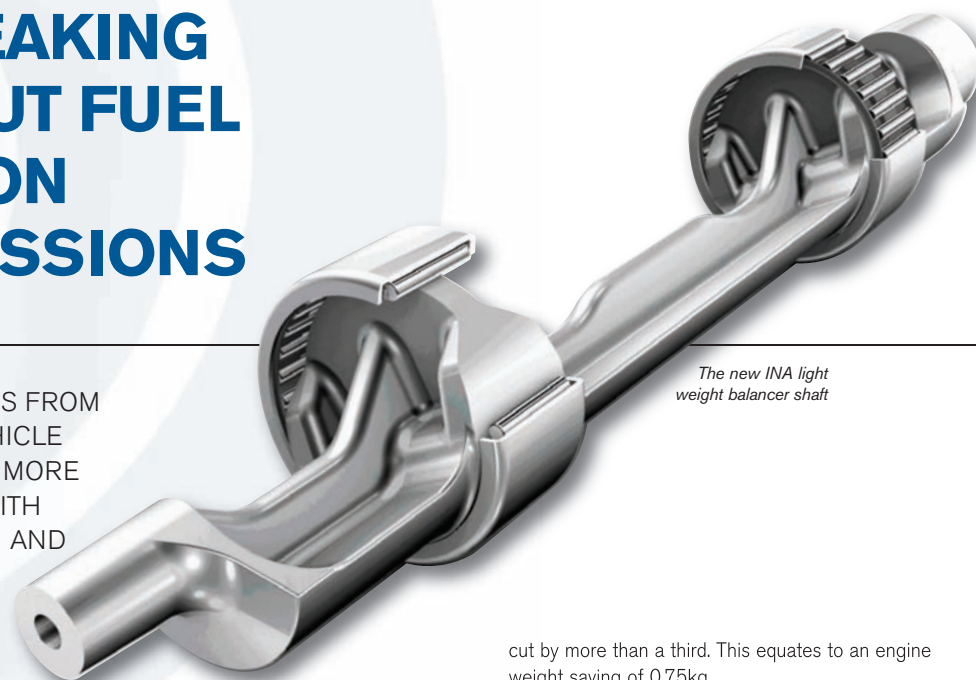
require energy when they are operating," explained Dr. Robert Plank, Manager of Corporate Engineering for the Schaeffler Group. "In hydraulically-controlled systems, the pumps need to maintain pressure at all times, resulting in much higher energy requirements."



GROUNDBREAKING BEARINGS CUT FUEL CONSUMPTION AND CO₂ EMISSIONS

INNOVATIVE BEARING SOLUTIONS FROM SCHAEFFLER ARE HELPING VEHICLE MANUFACTURERS TO PRODUCE MORE COMPACT, LIGHTER VEHICLES WITH IMPROVED FUEL CONSUMPTION AND REDUCED CO₂ EMISSIONS.

The latest of these innovations is the FAG wheel bearing, which is more compact and 10% lighter than its predecessor. The new bearing also offers simplified mounting via a unique self-centring, axial spur gear teeth design.



The new INA light weight balancer shaft

overall weight reduction of 1kg for a four-wheel vehicle.

With a unique spur gear teeth design in which the wheel bearing and axle journal are connected axially rather than radially, the bearing module is lighter and can be mounted clearance-free. Driving characteristics are improved and automotive manufacturers benefit from a simple mounting process and the associated cost reductions.

The new FAG wheel bearing is better equipped to deal with the loads that occur during vehicle operation. The spur gear teeth ensure positive connection between the wheel bearing carrier and the input shaft, which simplifies mounting considerably. The self-centring axial gear teeth are simply placed on the axle journal and fixed in place by using a central screw. Unlike radial gear teeth, this mounting procedure does not require significant force. The bearing remains clearance-free but is securely held in place during vehicle operation.

Having four lighter wheel bearings on the vehicle reduces the unsprung masses, which improves the driving characteristics and contributes to a reduction in CO₂ emissions.

Replacing plain with rolling bearings

Another unique bearing solution from Schaeffler is the INA lightweight balancer shaft and rolling bearing assembly. This is currently being used on the Mercedes-Benz OM 651, a 2.2 litre, four-cylinder diesel engine that produces up to 204ps and 500Nm torque. The weight of the INA balancer shaft and bearing assembly are optimised in order to improve engine efficiency and reduce overall fuel consumption.

By replacing conventional plain bearings on the balancer shaft with needle roller bearings with a raceway directly on the shaft, friction is reduced by up to 50% over the whole speed range.

By analysing engine load conditions, Schaeffler was also able to optimise weight distribution, enabling the width of the bearing to be reduced, which meant that the weight of the shaft could be

cut by more than a third. This equates to an engine weight saving of 0.75kg.

When designing the complete drive train for the OM 651, Mercedes was able to utilise this reduced shaft rotational inertia. The lower mass moment of inertia reduces the load in the power train, therefore improving the acoustic characteristics. In addition, the narrower raceway improves the oil mist supply to the rolling bearings, enabling a simpler system design without oil feed holes, reducing manufacturing costs. The engine requires a lower throughput of oil, so the oil pump can also be made smaller.

All of these technical improvements meant that engine fuel savings of around 0.5% to 1% were achieved.

If only 25% of all four-cylinder engines were fitted with INA lightweight balancer shaft assemblies, this would still reduce harmful CO₂ emissions by around six million tonnes per year.

The larger the vehicle, the greater the savings

Trucks, SUVs and light vans are also benefiting from innovative bearing solutions. By replacing 'line' contact associated with conventional tapered roller wheel bearings with a new design based on 'point' contact using ball bearings, Schaeffler has developed an innovative 'twin tandem' wheel bearing unit, which reduces friction by around 50% over conventional tapered roller wheel bearings. This equates to a 1.5% reduction in fuel consumption.

The twin tandem design is based on replacing the rows of tapered roller bearings with two rows of ball bearings in each case. A double row tapered roller bearing therefore becomes a four-row ball bearing. Replacing the line contact of the tapered rollers with the point contact of the balls eliminates rib friction and reduces overall friction by 50%.

Assuming a vehicle emits 300g/km of CO₂ over a distance travelled of 15,000 km per year, the reduction in CO₂ emissions resulting from the twin tandem unit will be 67.5kg per year per vehicle. Fuel consumption is also reduced by 1.5%, giving a reduction of 40 litres per year for an average light truck travelling 15,000 km per year.

THE WORLD'S FIRST FULLY VARIABLE HYDRAULIC VALVE CONTROL SYSTEM

CUTS EMISSIONS BY 25% AND IMPROVES THE DRIVING EXPERIENCE.

A groundbreaking system for automotive power transmission systems, which reduces vehicle fuel

consumption and cuts CO₂ emissions by up to 25 per cent, has been launched and has made its debut in Fiat's new Alfa MiTo 1.4 MultiAir.

UniAir, a joint development between the Schaeffler Group and Fiat Powertrain, is the world's first fully variable hydraulic valve control system.

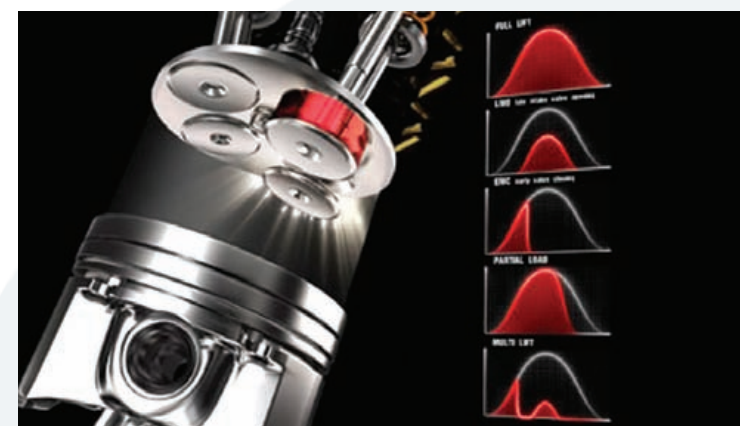
As well as offering car manufacturers a more compact valve control system, UniAir will help the automotive industry meet future CO₂ emissions targets for passenger cars whilst improving still further the driving experience.

UniAir provides improvements in the start-up, part load and acceleration behaviour of the vehicle. During the engine warm-up phase, for example, hydrocarbon (HC) emissions are up to 40 per cent less, and nitrogen oxide (NOx) is reduced by up to 60 per cent. In addition, UniAir offers a greatly improved driving experience through more power, higher engine torques and optimised engine response.

Car manufacturers will be particularly impressed by the fact that UniAir enables car engines to be downsized. Fiat uses UniAir in its four-cylinder FIRE series of engines and in its small volume two-cylinder engines that are currently being developed. As well as petrol engines, UniAir will also be available for diesel engine applications.

Developed for series production by Schaeffler, UniAir is based on an invention by the Centro Ricerche Fiat (CRF). The takeover of the license in 2001 marked the beginning of successful development collaboration between Fiat and Schaeffler, culminating in series production and market launch.

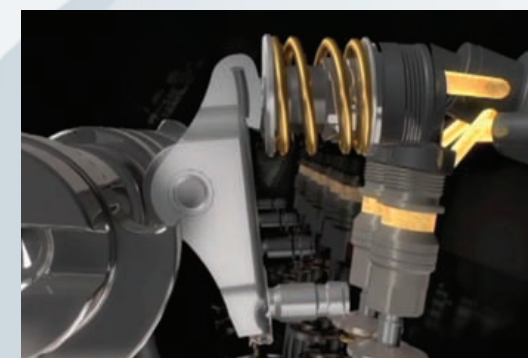
The final design specification was completed in 2007 and manufacturing facilities for series production started at various Schaeffler Group locations in 2008.



How it works

UniAir is a cam-actuated, electro-hydraulic valve train system. The fully variable valve control can be used for both petrol and diesel engines and is supplied via the existing engine oil circulation system. For petrol engines, UniAir enables throttle-free, continuously variable, software-based load control across the entire engine map. With diesel engines, regulation of the temperature of the combustion chamber is achieved due to the precise control of exhaust gas recirculation rates. At the same time, the effective compression ratio in the cylinder can be varied and a homogeneous combustion ensured.

For the first time, UniAir allows variations in the valve stroke and in the opening and closing of valves several times during one cycle, at different points in time. Therefore, the system



significantly expands the potential of traditional valve train mechanisms.

"UniAir is the beginning of a new era in valve trains and therefore in technology, producing engines that are eco-friendly and dynamic at the same time," commented Dr Peter Pleus, Executive Vice President of Schaeffler Group Automotive.

SUSTAINABILITY

MAJOR BREAKTHROUGH IN WAVE POWER TECHNOLOGY

PELAMIS AND SCHAEFFLER AIM TO LEAVE A LONG TERM CLEAN ENERGY LEGACY

WORKING CLOSELY WITH ENGINEERS FROM PELAMIS WAVE POWER, SCHAEFFLER'S BEARING SPECIALISTS HAVE ENABLED A MAJOR BREAKTHROUGH IN THE DESIGN OF THE NEXT GENERATION OF RENEWABLE WAVE ENERGY CONVERTERS.

By pushing the boundaries of bearing and seal technology and by thinking 'outside the box', a new renewable energy solution has been made possible by the cooperation of two companies keen to leave a long term legacy of clean energy.

For more than 10 years, engineers at Pelamis Wave Power have been developing a renewable

energy solution that offers both commercial viability and low environmental impact.

With a company ethos of innovation, constant research and development and a readiness to question and challenge existing technological thinking, Pelamis has succeeded in overcoming the quite incredible engineering challenge of operating continuously in the constantly active and

variable marine environment. Building on their experience in producing the world's first offshore wave energy converter, they have developed a 'P2' design which is more efficient and cost effective than its predecessors.

Crucial to the success of this new design are the bearings and seals. The main tube structures are connected by the main bearings units which use a

combination of Schaeffler bearings. There are also four hydraulic rams at each main joint, pivoting on precision bearing arrangements.

As Mike Woods, Senior Engineer and Bearings Group Leader at Pelamis, points out: "Our biggest challenge has always been how we manage the loads and motions from such an active and constantly variable environment, whilst at the same time extracting as much power as possible.

"The working forces generated across each joint can be several hundred tonnes, which

can present huge problems for the bearings as they have to take up the reactive forces coming back through the joints."

The first P1 wave energy converter was a simpler design which had separated hinged joints. Although this allowed useful working space between the axes, it had to carry high transferred loads and was unable to manage the combined motions necessary for the P2 configuration. Also, the bearings themselves were relatively high friction, making the system less energy efficient.

Mike Woods explains: "Our engineering team had been trying to work out a way of overcoming this problem and eventually came up with the idea of bringing the axes, or joints, together. However, this meant a completely new bearing solution which was able to manage combined angles in a single package, so we turned to Schaeffler for help and support."

Key to the success of the joint concept was a new, low friction material designed and developed in-house by Schaeffler engineers.

This modified PTFE fabric liner is a member of the Elgoglide® family and its low friction characteristics have effectively eliminated the problem of 'stick-slip'. This has allowed the

operating envelope of the machine to be extended beyond the capabilities allowed by standard bearing materials.

"Now that we have been able to put all the bearings in one place, we have taken a major technological step forward," said Mike Woods. "As well as being a much more efficient bearing mechanism, the new design is a self-contained, modular bearing unit. It is a bit like being able to take an engine out of a car in one go; it allows us to improve our inspection procedures and reduce our exposure to technological risk."

"Schaeffler has been with us every step of the way and has provided us with an extremely capable, enthusiastic and knowledgeable team of specialists to work with us on our ever-evolving application. We are constantly reviewing and developing the design of the machine. What has impressed us is the commitment and willingness of the Schaeffler team to cooperate in what has been a remarkably productive dialogue for both companies."

The first P2 unit, ordered by Eon, is now nearing completion and will be fully tested in the Spring of next year. Other leading utility companies have also expressed an interest

FOLLOWING THE SUN SCHAEFFLER BEARING FEATURE IN GIANT SOLAR POWER PLANT

More than one thousand high precision plain bearing rod ends from the Schaeffler Group are enabling the efficient operation of the Andasol solar power plants in southern Spain, currently the largest parabolic trough solar power station in the world.

The Andasol 1 solar power plant, which went online in mid-2009, uses a total of 1,248 ELGES hydraulic rod ends from Schaeffler. The function of the bearings is to support several hundred hydraulically adjustable, parabolic troughs, positioning them with millimetre precision and ensuring that the troughs continuously follow the sun. The rod ends are therefore directly

responsible for the plant's overall efficiency and economic viability.

For renewable energy projects, including solar and hydroelectric power plants, plain bearings are optimised for their slow, precise swivel motion. It is critical that these movements are smooth, without any stick-slip or jolting on start-up.

The hydraulic rod ends can also support high forces and are suitable for alternating loads. This means that the 150m-long collector chains at Andasol 1 can be adjusted precisely to within a tenth of a millimetre, enabling the troughs to follow the sun on its daily path from East to West.



The hydraulic rod ends are fitted with manganese phosphate-coated radial spherical plain bearings with steel/steel sliding contact surfaces. This special surface treatment improves the running-in characteristics and reduces friction.

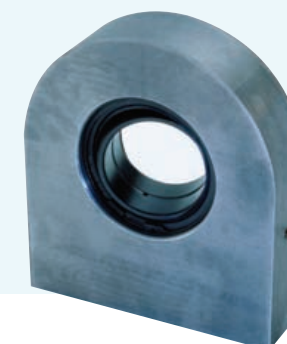
Schaeffler also provided 7,488 environmentally-friendly (lead-free) plain bearing strips for the Andasol 1 plant. These strips are mounted in the supports between the individual segments of the 150m collector chains, ensuring smooth slewing movements during the tracking of the sun.

Developed by Solar Millennium AG in Germany, the Andasol power plants are located in Andalusia, southern Spain. The three solar power stations are identical in terms of their construction and size and will be the first solar-thermal power stations to be constructed in Europe.

The 50MW Andasol 1 plant went online in mid-2009 and now supports the power

demands of more than 200,000 people, saving around 150,000 tonnes of carbon dioxide. Andasol 2 is currently in the testing stage, while Andasol 3 is still under construction.

The power plants comprise three main parts, the largest being the solar field, which has a collector area of more than 510,000 square metres – equivalent to around 70 soccer pitches. There is also a conventional power plant area and a heat accumulator, which ensures that the three plants are able to supply electric power even after sunset or when there are cloudy weather conditions.



GENERATION C BEARINGS FOR A GREENER WORLD

IN A WORLD WHERE REDUCING CARBON EMISSIONS AND IMPROVING ENERGY EFFICIENCY ARE TOP OF THE AGENDA, THE SCHAEFFLER GROUP HAS RESPONDED BY DEVELOPING A RANGE OF INNOVATIVE ROLLING BEARINGS THAT ARE HELPING CUSTOMERS TO PRODUCE 'GREENER' MORE ENERGY EFFICIENT PRODUCTS.

Schaeffler's new range of Generation C deep groove ball bearings, for example, offer 35% less friction and 50% less noise than predecessor products. The new bearings also benefit from more effective sealing and a new riveted steel cage.

The FAG Generation C deep groove ball bearings achieve higher running speeds and efficiencies, whilst simultaneously increasing bearing life and reducing energy consumption.

By optimising the raceway curvature between the balls and rings, these new bearings produce 35% less friction because they generate less heat, which makes them suitable for higher running speeds. They are ideal for applications in which low noise and smooth running are critical. This includes electric motors, power tools, ventilators and washing machines, where the reduced friction and improved energy efficiency of the bearings lead to a reduction in operating costs and a more efficient machine with extended maintenance intervals.

A new HRS seal, made from nitrile butadiene rubber, has a modified double lip geometry



resulting in longer grease life, which increases the life and reliability of the bearing and provides improved bearing performance at higher speeds.

In addition, the bearing shield has been modified further improving the sealing efficiency and increasing grease life.

The improved guidance of the rolling elements also contributes to higher performance of the bearing. The new riveted steel cage, which replaces the previous steel 'ribbon' cage, offers higher rigidity and so is suitable for higher running speeds. The riveted steel cage also reduces noise levels and means the bearing is less sensitive to shock loads.

Optimised for Electric Motors

The efficiency of small electric motors with a low capacity is primarily determined by the power loss of the bearings.

The new Generation C design reduces the frictional torque in the bearing and, as a result, the efficiency of the machine increases significantly. Energy consumption is also reduced considerably, providing economical and ecological advantages for manufacturers and users of electric motors, as well as for the environment.

Noise behaviour has always been a major quality issue in the electric motor industry. The deep



groove ball bearing is the machine element that separates static from rotating components and inevitably causes vibration and noise.

However, the new Generation C deep groove ball bearings have been designed to specifically address this problem with the result that they cut noise levels by 50% compared to predecessor products and provide manufacturers and users of electric motors with the solution to meeting current and future environmental requirements.

ENGINEERING GENIUS

THE INA CAGED NEEDLE ROLLER BEARING – 60 YEARS OLD AND STILL EVOLVING

ALTHOUGH THE BASIC DESIGN OF A NEEDLE ROLLER BEARING HASN'T CHANGED A GREAT DEAL IN THE LAST 60 YEARS, CONTINUOUS DEVELOPMENTS HAVE RESULTED IN NEW CAGE DESIGNS THAT PROVIDE FIVE TIMES THE SERVICE LIFE AND DOUBLE THE STATIC LOAD RATING OF THEIR ORIGINAL COUNTERPARTS.

It was in 1949, at the end of the Second World War, that Dr Georg Schaeffler and his brother, Wilhelm, founders of what is now the Schaeffler Group, invented a new type of needle roller bearing, the INA caged needle roller bearing.

It was whilst producing bearings for the US army that Dr Schaeffler set about overcoming the disadvantages of full complement needle roller bearings. Back then, bearing designs with rolling elements had a tendency to skew, particularly at high running speeds, and so suffered from an increase in frictional resistance (heat). In addition, the bearing locked easily where clearance was tight.

Dr. Schaeffler's solution was to guide the needles in a cage.

Working with a team of engineers at INA, he developed the idea until it was ready for mass production and then set out with his brother, armed with a case of samples, to convince customers of the advantages of his new needle bearing.

Some of the first customers to become converts to the new technology were Mercedes Benz and Adler Motorcycles and before long Dr Schaeffler's caged needle roller bearing had become an essential element in many automotive and industrial plant and machinery designs.

Proof of Dr Schaeffler's engineering genius lies in the fact that the caged needle roller bearing is still in use in its original design today.

However, the original design has not stood still and, has been improved continuously and adapted to meet increasingly diverse demands.

Today, INA needle roller bearings are manufactured in more than 15,000 variants, with new designs being customised to meet the special requirements of customer applications.

Machined INA needle roller bearings form the core of the range, particularly with the recent introduction of Schaeffler's X-life



premium quality standard. Needle roller bearings produced to X-life quality offer a 13 per cent increase in dynamic load rating compared to conventional bearings, which corresponds to a 50 per cent increase in service life.

These improvements mean less lubricant stress, reduced friction and lower bearing temperatures, resulting in a more energy efficient bearing. The increase in performance capacity also enables the bearing to be downsized for the application, with corresponding reductions in the weight of the bearing and its space requirements.

In the unlikely event that application requirements exceed even X-life standards, further performance improvements can be gained through the use of new bearing coatings and materials.

One project currently being undertaken at Schaeffler's Automotive Division involves the redesign of a high speed planetary gear set for an automatic gearbox transmission on a new hybrid electric passenger vehicle.

Stewart Davies, Senior Application Engineer at Schaeffler (UK) Ltd explained that a special design of cage for the needle roller bearing has enabled the customer's planetary gear set for the electric differentials to be reduced in size and weight by 17 per cent. The bearings, in combination with optimised oil flow through the carrier, have enabled 20 per cent higher running speeds (up to 8,000rpm).



Improved Oil Flow

Caged needle roller bearings can be assembled in many varieties including single split designs, half shell types, and single split with diagonal spring bar connections.

Originally, cages were designed simply to guide the rolling elements. However, more recently, needle roller bearings are being provided with much-improved cage designs, including for example, special precessed cages that help spread wear among all the rollers, and also distributes lubricant around the bearing.

As a result the latest caged roller bearing designs offer up to 25 per cent higher static load capacities for a similar size bearing, which equates to more than double the dynamic load rating. For applications with multiple small movements, bearing life typically increases by a factor of between 3 and 5.

NEW MOUNTING AND DISMOUNTING SERVICE FOR LARGE SIZED BEARINGS AND COMPONENTS

WHEN IT COMES TO THE MOUNTING OR DISMOUNTING OF LARGE ROLLING ELEMENT BEARINGS, FLEXIBLE INDUCTION HEATERS CAN SAVE SIGNIFICANT TIME AND RESOURCES, INCREASE THE LIFE OF BEARINGS AND MAXIMISE THE AVAILABILITY OF CRITICAL PLANT AND MACHINERY.



In order to correctly mount or dismount bearings, it is usually necessary to heat the bearing first. There are a variety of heating methods available to do this, each with its own advantages and disadvantages, particularly when it comes to heating large-sized bearings (1500mm outside diameter and above). The options here include using an oil bath, a gas flame burner, or a medium frequency induction heater.

The problem with an oil bath is that you need to have, or construct, a large enough bath for the bearings to be heated in. You'll also need hundreds of litres of oil, which must then be disposed of in the appropriate way when the project is complete.

Using gas flame burners is a much easier method in terms of preparation. However, with gas burners, there is also a risk of local overheating, which can cause changes to the structure of the component and, after heating is completed, the bearing may need to be cleaned or the housing re-painted.

Induction heating

Induction heating is a superior heating method. It is faster, cleaner and more suitable for batch heating. Heat is transferred directly to the workpiece and unlike alternative heating methods, does not need to be transmitted via convection, radiation or thermal conduction. Fixed and mobile induction heaters are available.

As induction heating is uniform across the bearings, local overheating is prevented.

Due to their increased energy efficiency, induction heaters can reduce heating times by up to 50 per cent, keeping maintenance costs to a minimum. Since the systems do not require oil, they have the added advantage of being both clean and environmentally friendly.

Flexible Induction Heating

However, induction heaters are not always

effective with large-sized bearings and housings.

The housings (e.g. plummer blocks) for large-sized bearings normally have an unusual shape, making it difficult to fit the component in the heater.

Flexible induction heaters from Schaeffler can solve all these issues. These medium frequency induction heaters are fitted with flexible inductors, which offer complete flexibility when it comes to the size and geometry of the workpiece or bearings.

The flexible heating cable can be placed in and around the workpiece, or in areas of a component that would normally be inaccessible.

The workpiece itself does not necessarily have to be a bearing; it could be any large circular, ring-shaped steel structure that requires heating - eg bearing seats in a machine carrier such as a wind turbine. Other applications include the preheating of welds in pipeline construction, as well as the dismantling of bearing inner rings and other shrink connections.

Preparation time with flexible induction heaters is relatively fast and heating time is only 1-2 hours, depending on the size and mass of the bearings. The heating process itself is automatic, which means resources are not tied up, and the bearings do not require cleaning post-heating. A sensor is mounted to the bearing in order to monitor the temperature during heating. Once the bearings have been heated to the required temperature, the heater is stopped automatically.



'A TO V' CONDITION MONITORING

EXTENDED PACKAGE COVERS ALL MAINTENANCE SCENARIOS

COMPANIES THAT NEED TO MONITOR THE CONDITION OF BOTH SLOW AND FAST ROTATING PLANT AND MACHINERY CAN NOW BENEFIT FROM A UNIQUE COMBINATION OF VIBRATION AND ACOUSTIC EMISSION MONITORING PRODUCTS FROM A SINGLE SOURCE IN THE UK.

Schaeffler (UK) Ltd has extended its condition monitoring range of products and services to offer customers a complete 'A' to 'V' of acoustic emission and vibration monitoring products.

Whilst most suppliers of condition monitoring equipment and services offer either vibration or acoustic emission monitoring, Schaeffler's range now includes both systems. The products cater for every maintenance scenario and all types of rotating equipment, from high speed rotating components or machines to slow moving (0.25rpm) mechanical systems with fluctuating loads.

Schaeffler provides three main types of condition monitoring systems: handheld monitoring; fixed/online monitoring; and semi-portable, multi-channel acoustic emission monitoring.

On the handheld side, Schaeffler continues to provide its popular FAG Detector III range of handheld vibration monitoring devices, but is now offering a handheld acoustic emission monitoring device, the AE-Check. This device is ideal for monitoring the condition of slow rotating, variable speed and load machinery such as mixers, motors, pumps, fans, HVAC systems, bearings and helical gears.

As Dr Steve Lacey, Engineering Manager and Condition Monitoring Specialist at Schaeffler UK comments: "Whilst vibration monitoring is fine for high speed machinery, it is much less effective where components are rotating at less than 80rpm, operating under fluctuating load conditions, or only moving through a part revolution. Here, it is much more difficult to collect meaningful data using vibration monitoring. The ideal solution for these scenarios is acoustic emission monitoring."

The AE-Check is a route mode acoustic emission monitoring device that is easy to use and configure. The user can set up to six different routes through the factory, with up to 435 measuring points per route - ideal for patrol monitoring.

The device comes with a standard acoustic sensor that simply connects to the handheld device.

The integrated software includes a 'Super-Slo' mode that enables the measurement of very slow rotating equipment, from 60rpm down to 0.25rpm. The 'Standard' mode monitors faster rotating equipment from thousands of rpm down to 35rpm.

For companies that require continuous 24/7 condition monitoring of high value critical machinery, Schaeffler offers its fixed, online FAG ProCheck system, a dual online system that enables maintenance teams to monitor both vibration and acoustic emissions.

By combining the modular FAG ProCheck system with multiple smart acoustic sensors, the system can now monitor vibration and trend acoustic emissions of variable speed rotating components and machines, especially where fluctuating loads are present.

The third part of Schaeffler's unique offering is AE-Pro, a new semi-portable acoustic emission monitoring system that, in terms of cost and performance, sits between the handheld range and the fixed/online systems. AE-Pro is ideal for use on plant that doesn't warrant a fixed system, but still requires more than instantaneous data collection.

AE-Pro is a portable multi-channel PC Notebook-driven data acquisition and signal analysis system that captures acoustic emission signals generated by machinery and other rotating components and systems.

"The AE-Pro is a very powerful semi-portable acoustic monitoring tool that enables our engineers to conduct one-off investigations on more complex pieces of critical plant or machinery," said Dr. Lacey. "The functionality and performance are superior to a simple, handheld device because much more detailed analysis data can be provided on exactly where any damage is located."



MAKING MEDICAL EQUIPMENT SAFER AND MORE FLEXIBLE

Technical equipment used in hospital operating theatres is subject to stringent requirements in terms of safety, reliability and flexibility and the contribution made by rolling bearings and linear guidance systems in these instruments and mechanical devices is critical.

Operating tables and ceiling mounts, for example, play a vital role in creating a flexible, reliable operating environment which, in turn, directly impacts the quality of the surgery being performed in the theatre.

Through its INA and FAG branded bearings and linear guides, the Schaeffler Group has developed a wide range of standard and custom bearing solutions that meet and often exceed the rigorous quality and safety standards for operating theatres and other medical environments.

Bearings for ceiling mounts

Diagnostic imaging procedures performed during operations, for example, require extra space for monitors, which need to be positioned very close to the operating table. By attaching supply stations to ceiling

mounts, it is possible to connect numerous devices, including PCs and monitors, and the swivel arms on the mounts allow for flexible, customised positioning of this equipment inside the operating theatre. These ceiling mounts must, therefore, be able to

accommodate high loads, but move with minimal effort, while providing sufficient space for power, oxygen and data supply lines.

For these types of applications, Schaeffler Group developed its AXS axial angular contact roller bearing. Installed in pairs, AXS bearings can withstand high loads and tilting moments, while ensuring that the movements of the ceiling mounts are smooth and quiet.

The AXS angular contact bearing is compact and lightweight, which means installation space is optimised, and offers very high load ratings, which allow a significant increase in bearing preload (e.g. in swivelling movements) that further enhances tilting rigidity, if required.

The bearing is quick and easy to assemble, while the precision-turned seats, which are simple to manufacture, significantly reduce the overall cost of this component.

Schaeffler's ZAXFM bearing assembly, which can be either flange- or screw-mounted, is an advancement of the AXS series. Ready to mount, this bearing assembly is preloaded and greased at the factory. The adjusting nut is mounted directly to the bearing's inner ring and preloaded to the specified torque.

Linear motion for operating tables

An operating table has to be sturdy, whilst offering as much freedom of movement as possible. Vertical adjustment means the table can be easily adapted to the height of the surgeon. Vertical adjustment also makes transferring the patient from the operating table to another bed or wheelchair much easier and safer.

The linear guides for these applications

must, therefore, meet stringent standards of quality, reliability, load-carrying capacity and safety.

Schaeffler's KUVE and KUSE profiled rail linear guides are ideal. These linear recirculating ball bearing and guideway assemblies have four and six rows of rolling elements respectively, which offer extremely high load-carrying capacity.

The linear guides are also available with Schaeffler's Corroctect® coating, which provides the rolling elements and raceways with optimal corrosion protection. Other coatings, such as TRIONDUR, ensure high wear resistance and outstanding dry-running characteristics in situations where there is insufficient lubrication.

For noise-sensitive applications, INA four-row linear recirculating ball bearing and guideway assemblies use quad spacers located between the ball elements, which reduce the running noise significantly.

Non-magnetic bearings

Schaeffler also offers bearing solutions suitable for use where stereotactic surgery, which maintains ultra-precise control of catheters and other instruments is performed. Using magnetic fields, a computer guides the tip of the catheter through the bloodstream and ventricles with the utmost precision, directly to the point of treatment. Since the viability and success of this procedure depends on magnetic fields, the operating table itself must be non-magnetic.

Therefore, any bearings or linear guides used must also be non-magnetic. Schaeffler's innovative, custom solution: the KUVE-B-AM linear guidance system has a permeability (μ_r) of less than 1.02.



NEW medias® 5.0 NOW ONLINE



A new version of the Schaeffler Group's product selection and information system, medias® 5.0, has gone online. The revised system is much faster, more secure and easier to use.

medias® is the product selection and information system for rolling bearings, plain bearings and linear guidance systems supplied by the Schaeffler Group. It makes the technical product data available to users and enables them to perform calculations according to the catalog standard. The direct transfer of CAD data into the user design is also possible. Enquiries can be directly submitted online.

Many functions can be accessed directly, without having to pass through the entire product selection process and the fast and comfortable call up of CAD data accelerates the engineering process.

medias® 5.0 includes all basic technical

information plus updated product data and descriptions from the revised printed catalogues. A new 'bearing selection assistant' makes it possible to select rolling bearings based on the required properties and the available mounting space.

Numerous improvements from the Bearinx® calculation system have also been included in medias® 5.0 and the updated 'contact partner selection' function and the simplified enquiry function make working with medias® 5.0 particularly easy and user-friendly.

NEW LINEAR SOFTWARE FOR BEARINX®

New calculation software for monorail guidance systems, which helps distributors and end users to minimise development times for new machine builds is now available. The software is free-of-charge and is permanently available via the Internet.

Linear • EasySolution is the latest software module for the popular rolling bearing calculation software Bearinx®. Linear • EasySolution calculates the basic rating life of a driven linear axis that is supported by rolling bearings. The software is easy-to-use with an intuitive menu system that provides clear instructions on how to input data.

The software contains the most commonly used linear axis combinations in pre-configured arrangements comprising a drive, guideway and carriage. There is also an option to freely select an axis combination using up to four guideways and 16 carriages.

Linear • EasySolution enables designers to calculate and select the most appropriate linear guidance system at an early stage in the design process. The software simulates the actual

stresses and loads on the guidance elements, taking contact angle displacement into account, as well as the non-linear deflection behaviour of the rolling element contacts and the elastic guideway and carriage. Exact calculations for the internal load distribution in the bearing are performed, including contact pressure with the actual rolling element profile and various pre-load classes. This enables users to minimise development times for new machine builds.

The calculation tool uses unique software algorithms in order to simulate linear rolling bearings. All the data inputs for calculations, such as axis arrangement, forces and load cases, can be saved for further processing and optimisation. The documented calculation result can then be outputted as a PDF file.

Linear • EasySolution is available exclusively online and can be used free of charge without restrictions. After registration – which takes a short time – users can begin calculations straight away.



Linear • EasySolution can be used for calculations across the complete range of INA monorail guidance systems, including linear recirculating roller bearing and guideway assemblies (RUE-E); two-row linear recirculating ball bearing and guideway assemblies (KUE); four-row linear recirculating ball bearing and guideway assemblies (KUVE-B); six-row linear recirculating ball bearing and guideway assemblies (KUSE); two-row miniature linear recirculating ball bearing and guideway assemblies (KUEM); and four-row miniature linear recirculating ball bearing and guideway assemblies (KUME-C).

PUPILS SOLVE A PROBLEM AND WIN A TOP AWARD

A team of pupils studying A level Physics at Ysgol Gyfun Gwyr comprehensive school in Swansea has walked away with joint top marks at this year's National Competition run by the Engineering Education Scheme of Wales, having solved a tricky quality problem for Schaeffler UK's automotive plant in Llanelli.

The eight-strong team, together with their teacher David Wheeler, decided to enter the competition in order to put into practice some of the theoretical physics they had been taught and to get a real taste of the type of work engineers face every day.

They were invited to work with Schaeffler to solve a problem the company was experiencing in its tappet manufacturing facility. Blade cutters in the machinery were not always cutting the grooves on the tappets. This was due to a malfunction of a

pressurised arm which fed the tappets from a queuing system to a collet which would hold the tappet in place for the cutting process. The arm was either not lowering or lowering the tappets too much and, as a result, cut and uncut tappets could end up in the same crate.

The competition was based on a 6-month project and the students were required to solve the problem by developing numerous ideas and models. They then had to produce a 100-page thesis on the eventual solution and present their ideas in front of a panel of judges and the other competing schools.

The final solution developed by the students was an 'L' shaped ramp equipped with plungers to enable individual tappets to fall for cutting, a spring loaded finger to push the tappets into the collet and a sensor to ensure the process could go ahead.



The new piece of kit is now fully operational at the Schaeffler plant and has been projected to save the company over £14,000 a year.

David Wheeler, Head of Physics at Ysgol Gyfun Gwyr, said he was extremely proud of the students.

"They were competing with over 100 experienced teams and at their first attempt they won one of the prestigious awards."

THEY WERE A KNOCKOUT



As part of a fun day for local companies and customers the Plymouth-based Barden Corporation, a Schaeffler company specialising in super-precision bearings, organised an 'It's a Knockout' tournament to test teamworking skills, brains and not a little brawn. At the end of the contest a team of 'footballing old boys' (see the wigs!!!) from Schaeffler UK at Sutton Coldfield came out on top and won the champagne prize, which they then generously sprayed F1 style over all the participants.

The Midlands started slowly but then started to pick up points, winning the 'bingo' event and gaining maximum points on their 'Joker' when they proved to be the most adept at carrying water over an inflatable assault course.

The Barden day was a great success and was thoroughly enjoyed by all involved.

The Minworth team included (back row, l to r) Andy Fergusson, Gary Mackintosh, Rob McDonald, Aaron Brock, Christian McGowan, Richard Oldfield and (front row, l to r) Andy Beasley, Mark Imeson, Rob Gaskell and Keith McGowan.

A LONG SERVICE BIKE FOR BRIAN

To mark both his 40 years service with the company and his 65th birthday, Brian Fox, Engineering Manager at Llanelli, was presented with a unique gift – a model bicycle made by personnel in the Toolroom using materials from production.

The gift, mounted on a wooden plinth and engraved with congratulations and best wishes from his colleagues, was particularly appropriate as Brian is a sports enthusiast and enjoys cycling and running. The actual presentation



came as something of a surprise to Brian – it was made while he was participating in a training session on business improvement techniques.

60 YEARS YOUNG

John Porter, who works as a turning technician at Llanelli, celebrated his 60th birthday in June and his colleagues were on hand to congratulate him. Pictured with John (2nd left), who joined Schaeffler in 1979, are (l to r) Meirion Rees, Production Supervisor, Roger Evans, Plant Director, and Derrick Lewis, Process Engineering Manager.



the Technical Office, a post he held until 1989, when he became Assistant to the Group Quality Manager. He was appointed Chairman of the BRBMA and BSI Standards Committee in 1994 and became Systems and Standards Manager of INA UK three years later.

Although he formally retired from INA in 1998, Brian continued to work as an independent

consultant to the company until 2001 and also continued to serve on the BRBMA Standards Committee.

Brian, whose funeral was held at Wigginton Church on June 21, was aged 71. He is survived by his wife and two children. He will be sorely missed by his former colleagues and friends at Schaeffler.

TIM GOES 'HOME' TO FORD



Tim White is Schaeffler Automotive's new Resident Engineer at the Ford Motor Company's Technical

Centre at Dunton in Essex – and for Tim it's a matter of going 'home'.

He actually started his career at Ford straight from school in 1984 and spent seven years with the company completing a four-year tool making apprenticeship and then gaining an HNC in production engineering and CAE engineering.

He then spent eight years working in various engineering positions with

Trelleborg Stanton, which produced interior plastic formed components and NVH products, before moving to Ohio in the USA to work as a Sales Engineer for the XLO group, producers of interior NVH components.

After four years, he returned to the UK to join the Dana Corporation/Nobel Automotive as Resident Applications Engineer based at the Ford Technical Centre, helping to create designs for chassis and powertrain components, a post he held for seven years.

He will now fulfil a similar role for Schaeffler, working in partnership with Ford's own engineering team and says he is looking forward to the new challenge.

...AND SASCHA HEADS BACK TO GERMANY



Richard Hall with Sascha Lutkic

Tim is actually replacing Sascha Lutkic who is returning to Schaeffler in Germany where he will take over as Head of Key Account

Management for Audi after a three-year secondment as Schaeffler's first Resident Engineer at Ford. His success in the role was celebrated at a farewell dinner when his work was praised by Richard Hall, Sales Director and General Manager of Schaeffler UK's Automotive Division. Sascha was also presented with a compass to mount on his dashboard – a reminder of his first ever day in the UK when he accidentally tapped the incorrect postcode into his satnav and ended up in Sheffield instead of a hotel in Sutton Coldfield.

RUNNING FOR CHARITY



Richard Oldfield, Credit Controller at Schaeffler UK, is terrific at collecting money...for both the company and charity. Richard has run the last 15 London Marathons and in the process has collected around £22,000 for various charities, including St Giles Hospice, Acorns Hospice and, over the past six years, for Cardiomyopathy.

This year he was joined in the race by his daughter Anna (for the first time) and his son James (for the

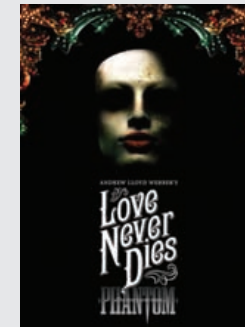
fourth time). Anna finished the course in 4 hours 10 minutes, with Richard and James completing the marathon together in 5 hours 20 minutes. In the process they raised £2000.00 for the charity.

"James has now decided to retire, but Anna and I will carry on for the cause and, hopefully, my wife Julie will rejoin us next year," said Richard.

Well done to the Oldfield family on a truly 'credit-worthy' performance.

The column where members of the Schaeffler team cast a critical eye over the latest entertainment offerings. Here Siobhan Griffin, New Business Co-ordinator in Marketing Services, provides her views on the some of the latest offerings in musical theatre and on the big screen:

LOVE NEVER DIES



Andrew Lloyd Webber's sequel to the record breaking show 'Phantom of the Opera' proved to be a little less than expected! Don't get me wrong, it was good, but it lacked the 'wow' factor that 'Phantom' had - and still has, where theatre audiences were delighted by the technical wizardry, falling chandeliers and all.

Love Never Dies continues the story of Christine/Raoul and the Phantom - but 10 years on. The story takes place on New

York's Coney Island in the 1920s, where the Phantom now owns the fair with the ever popular 'Phantasma show'. Christine, now a world famous opera star, is invited to sing at a gala concert on the Island, but is unaware that the invitation has come from The Phantom. She readily agrees, hoping to make her American debut and to earn the money that is needed to pay off Raoul's colossal gambling debts.

We are also re-introduced to Madam Giry and her daughter Meg, who had smuggled The Phantom out of Paris 10 years earlier and have supported him financially in New York. As with The Phantom of the Opera, the story ends in sadness.

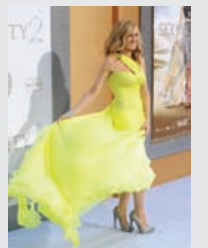
There is no denying that the musical score is amongst Andrew's finest work, with the only disappointment being interludes of 1920s' style music which somehow didn't seem to work in the grand scheme of the score.

There is the familiar major to minor weaving of the music we came to love in the Phantom, but only one tiny bit of the original score is used, which some might find a disappointment. There is also a weird 'rock' number in a scene where The Phantom meets Christine's 10 year old son. Even though this seems out of place in the score, it does fit into the grand scheme of things.

The disappointment was that there is no real 'spectacle' - you're left a little 'wanting', not helped by a lack of chemistry between The Phantom and Christine which is crucial in an operetta where there is no dialogue.

Would I recommend it? Yes, but I wouldn't suggest anyone rushes out to see it. Maybe if we wait a while, Andrew will make some changes for the better!

SEX AND THE CITY 2



The much anticipated film following the lives of the group of 40-something women in New York was, in my opinion, an excuse for as many shots as possible of (in many cases) 'horrible' high fashion outfits!

The film lacked flow - in fact the first half hour could have been completely cut with the only funny lines being delivered by Samantha, which you would expect. It lacked the belly laughs of the first film and seemed to be a little disjointed.

The basic story line is that Samantha is tasked to devise a PR campaign for a new hotel in Abu Dhabi, and is offered an all expenses trip out to the UAE. Samantha agrees, but only if she can take her 'friends' with her.

We then have a series of scenes following the antics of the girls whilst out and about in unfamiliar territory. Side issues include Samantha trying to cope with the onslaught of the menopause (she is now 52!); the familiar story of Carrie's relationship with 'Big'; Charlotte's struggles to cope with two young children; and Miranda trying to come to terms with quitting her high powered job.

This is the sort of movie you watch at home, with a glass of wine and some nibbles. It's not one where you go to the expense of a trip out to the cinema, even if you are going with your girl friends! There were five of us when I saw it and we all felt the same: **If you haven't already seen it, wait till it comes out on DVD!!**

**FAG**

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For over 25 years Schaeffler engineers have been developing bearing technology that delivers the most critical requirement of renewable energy systems – reliability.

As a result, Schaeffler's low friction rolling bearings, designed to achieve a minimum of 20 years operational life, are now the preferred option to support the rotor, alternator and gearbox in wind turbines throughout the world.

Schaeffler double row spherical roller bearings, radial ball bearings and maintenance free spherical plain bearings are also playing a vital role in wave and tidal stream systems under development.

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