

MOBILITY FOR TOMORROW

高效驱动 驰骋未来

— Interview with Dr.ZHANG YILIN, the CEO of Schaeffler Holding (China) Co., Ltd.

— 访舍弗勒大中华区、舍弗勒投资（中国）有限公司首席执行官张艺林博士

舍弗勒代表最高品质、卓越技术和强大的创新能力。

凭借高精密的发动机、变速箱及底盘部件和系统，以及滚动轴承和滑动轴承解决方案，舍弗勒为实现“高效驱动，驰骋未来”（Mobility for tomorrow）战略做出关键贡献。舍弗勒集团 2015 年销售额为约 132 亿欧元，有员工约 8.4 万人，是世界最大的家族企业之一。舍弗勒在 50 多个国家设有约 170 个分支机构，形成一个集生产基地、研发中心、销售公司于一体的全球性网络。

本刊记者：能否介绍一下舍弗勒集团的概括和在中国的发展情况？

张艺林博士：舍弗勒是全球领先的综合性汽车和工业产品供应商。我们的产品应用于一切运动的物体，无论是机械设备、交通车辆还是航空航天飞行器，都有我们研发和生产的精密产品。

舍弗勒的轴承产品进入中国市场已经有几十年的历史。我们正式在中国投资生产是从 1995 年，在太仓设立第一个工厂。目前，我们在太仓、苏州、银川和南京设有四大生产基地，共有工厂 8 座，拥有员工约 1.1 万人。经过 20 多年的发展，舍弗勒大中华区已建



舍弗勒大中华区、舍弗勒投资（中国）有限公司首席执行官张艺林博士
Dr.ZHANG YILIN, the CEO of Schaeffler Holding (China) Co., Ltd.

□本刊记者：李莉

立起包括生产、销售、研发、后市场和技术支持在内的全面用户服务体系和竞争优势，产品广泛应用于中国的汽车产业和工业市场。我们的区域总部在上海安亭，这里同时还是德国总部以外最大的研发中心，同时我们在北京、上海、香港、台湾等全国地设有 22 个销售办事处。

本刊记者：舍弗勒是德国知名的制造企业，请问贵公司在创新和先进制造方面有什么优势和经验？

张艺林博士：如果从 1883 年费舍尔先生发明球磨机，从而开启滚动轴承工业算起，舍弗勒集团已经有 133 年的历史。概括来说，舍弗勒的成功要素有三点：质量、技术、创新。舍弗勒的独特成功之道在于其前瞻性思维和长远的发展战略。我们能在技术和

市场趋势的早期阶段就确定目标，投入研发资源开发面向未来的新产品，定义新的技术标准，实现量产。

舍弗勒在制造方面的专长和全面的质量管理体系确保我们的产品质量显著高于行业平均水平。我们在质量方面的目标是“零缺陷”，我们注重流程的稳定性和持续改进，并在早期阶段识别和消除缺陷，防止错误发生。我们在制造领域拥有丰富的专业知识，舍弗勒是众

多制造技术的行业领导者，如冷成型、锻造和热处理等。

舍弗勒在全球拥有 17 个研发中心和 6,700 名技术人员。据德国专利与商标局统计，舍弗勒年申报专利 2000 多项，连续第二年被评为德国第二最具创新力的公司。我们的专业技术来自多年的积累，如表面和涂层技术。舍弗勒表面技术中心开发有最佳的涂层，声学技术中心则对每种类型的噪声和振动测试进行优化。这些既来之汽车又来自工业的技术通过全球技术中心为客户服务。

本刊记者：您在前面提到“高效驱动，驰骋未来”战略，请问这一战略都包括什么？

张艺林博士：舍弗勒通过对全球交通解决方案的研究，对 2025 年的客户需求和行为模式进行了调查，确立了未来世界不同地区市场对交通方案的需求。研究显示，尽管全球化进程还在继续，但没有一个整体的解决方案可以解决所有交通问题。在全球化、城市化、数字化、资源短缺、可再生资源问题等一系列大背景下，人们对高性价比的交通需求日益高涨。在这些大趋势下，舍弗勒提出了“高效驱动，驰骋未来”的战略概念，并重点关注四大领域：环保友好型驱动、城市交通、城际交通和能源链。舍弗勒通过各种研发活动积极参与和改变这些关注领域，为客户与合作伙伴提供具有吸引力的产品系列。

舍弗勒具备内燃式发动机辆、混合动力和电动汽车传动系统有关的全面技术。舍弗勒凭借广泛的知识和技术优势，不仅在汽车行业独树一帜，而且将其技术应用到其他类型的城市及城际交通解决方案上，如双轮交通工具、铁路和航空交通工具等。同时，作为能源领域的开发合作伙伴，舍弗勒通过开发摩擦最小化的产品以最有



效地的方式利用能源。

“高效驱动，驰骋未来”战略在中国也在积极推动中，而且中国工程师已经开发出不少创新产品，其中代表性的有舍弗勒中国概念车和轮毂电机驱动系统。舍弗勒中国概念车由舍弗勒德国团队支持，中国研发工程师进行开发，基于一款中国本土轿车，采用舍弗勒开发的 P2 混合动力系统，可大幅降低油耗，并拥有出色的动力性能。中国工程师团队还独立开发了轮毂电机驱动系统，将电机、制动和冷却等装置都集成在汽车轮毂内，实现车辆的轮内电驱动和零排放出行。

本刊记者：能否介绍一下舍弗勒在汽车和工业两大领域的特色产品和解决方案？

张艺林博士：汽车业务是舍弗勒的主要业务。舍弗勒是被业界认可的系统产品开发伙伴，以 INA、LuK 和 FAG 为品牌的汽车产品覆盖乘用车和商用车的全部动力传动系统，如发动机、变速器、底盘和附件设备等。舍弗勒汽车业务的核心产品包括离合器系统、变速箱零部件、扭力减震器、气门机构、凸轮相位调节系统和电驱动系统等。从传统内燃机传动系统的优化，到混合动力汽车，一直到纯电动汽车，舍弗勒的广泛产品线都得以覆盖。我们的客户包括全球所有的知名整车制造厂和主要的零部件供应商。

舍弗勒工业事业部在 INA 和 FAG 品牌下，向 60 个不同的工业部门提供滚动轴承和滑动轴承解决方案以及直线和直驱技术。舍弗勒的工业产品多达 22.5 万种，从小至数毫米的微型轴承如牙科钻





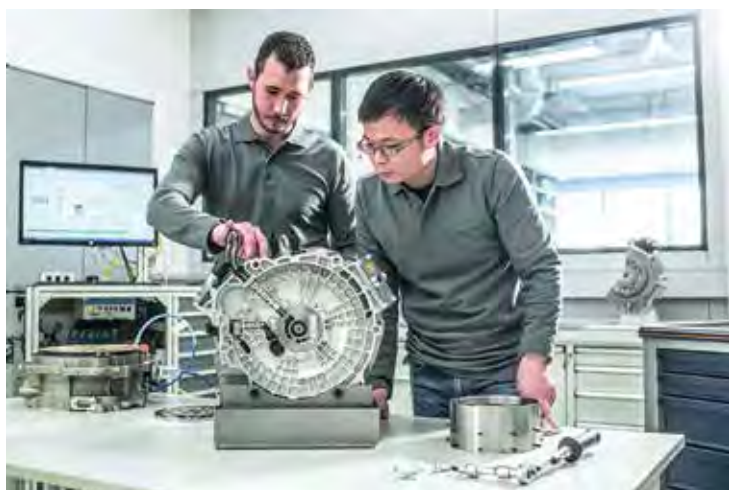
子轴承，到大至外径数米的大型轴承如风力涡轮机轴承。航空航天业务是舍弗勒工业事业部的重要组成部分，为飞机、直升机和火箭发动机提供高精度轴承产品，其中的代表性应用包括空客 A380 和波音 787 “梦想客机”。此外，舍弗勒还向医疗设备等领域提供高精度轴承产品及特殊应用。

舍弗勒电驱动部门横跨汽车和工业两大事业部，开发面向未来的各种电驱动产品，目前的产品范围从电动自行车带传感器中轴、起停系统、混合动力离合器，直至纯电驱动系统。

本刊记者：“中国制造 2025”对于舍弗勒这样的先进制造跨国公司会带来哪些机遇和挑战？舍弗勒有哪些“工业 4.0”方面的产品和解决方案？

张艺林博士：纵观中国“十三五规划”和“中国制造 2025”，舍弗勒在以下行业会看到更多的发展机遇：可再生能源（风电）、精密生产机械、医疗设备、航空航天、铁路、动力传动及重工业、新能源汽车和非轴承服务业等。

未来 10 年，中国至少需要每年 100 万台高端数控机床，而轴承是机床中的核心部件之一。中国每年对于高铁和轨道交通的投入将达到 6,000 到 7,000 亿人民币，而且通过“一带一路”计划，中国的高铁还将出口到“一带一路”国家和地区。从 2016 年到



2020 年，全球新装风电能源设备预计为 276 兆瓦，其中中国将达到 117 兆瓦，占全球新增总数的 42%。舍弗勒在以上领域都具有优势产品和解决方案。

我们与合作伙伴一道，提出了“机床 4.0”解决方案，利用现有生产技术与传感器、云技术和数字化零部件的连接，开发出具备数字化功能的新型智能化机床解决方案。我们通过传感器、网络和数据分析，利用轴承在不同工艺流程中收集信息形成大数据，以此为客户创造出更清晰明显的增值空间。作为机床用户，舍弗勒的内部生产也与这个工业 4.0 计划直接相关。舍弗勒在机床数字化方面的实践行动证明，通过制造商、供应商和用户之间的密切发展合作，可以把行业挑战成功转换为新的发展机会。

本刊记者：能否介绍一下舍弗勒在履行企业社会责任方面做出的贡献？

张艺林博士：可持续管理和履行社会责任是舍弗勒企业文化的组成部分。无论对客户、环境还是员工，舍弗勒都十分重视经济效益和履行责任的结合。舍弗勒所有的制造流程都符合严格的法律和



内部环保要求，全球所有工厂均遵守 ISO14001 或更严格的欧盟生态管理与审核计划（EMAS）指令。在国际层面的环境保护方面，舍弗勒是积极的行动者。

我们在中国设有舍弗勒希望学校，每年都会派出志愿者去学校支教。在舍弗勒的各个生产基地，我们还设有培训中心，通过引入德国“双元制”教育系统，为公司和当地社会培养理论和技能并重的优秀人才。如在太仓，我们与苏州健雄职业技术学院和同济大学设有国内首个双元制应用本科项目，广受好评，并因此入选“2015 中国外商投资企业履行社会责任优秀案例”，并被授予“社区好邻居”称号。

The company stands for the highest quality, outstanding technology, and strong innovative ability. The Schaeffler Group makes a key contribution to "Mobility for tomorrow" with high-precision components and systems in engine, transmission, and chassis applications as well as rolling and plain bearing solutions for a large number of industrial applications. The technology company generated sales of approximately EUR 13.2 billion in 2015. With around 84,000 employees, Schaeffler is one of the world's largest family companies and, with approximately 170 locations in more than 50 countries, has a worldwide network of manufacturing locations, research and development facilities, and sales companies.

Multinationals in China: Please introduce in brief the Schaeffler Group and its presence in China.

Dr. ZHANG YILIN: The Schaeffler Group is a leading global integrated automotive and industrial supplier. We develop and manufacture precision products for everything that moves, in machines, equipment and vehicles as well as in aviation and aerospace applications.

Schaeffler products have been introduced to China for decades. Since its investment in China in 1995, Schaeffler Greater China has established a comprehensive customer service system and built up competitive advantages in manufacturing, sales, R&D, aftermarket and technical support. Schaeffler's products are widely used in China's automotive industry and industrial market, contributing added value to customers. Currently, Schaeffler Greater China has around 11,000 employees; one R&D center in Anting, 8 plants in Taicang, Suzhou, Yinchuan and Nanjing; and 22 sales offices nationwide including in Beijing, Shanghai, Hong Kong and Taiwan.

Multinationals in China: As a famous German manufacturing company, what is your advantage in innovation and advanced manufacturing?

Dr. ZHANG YILIN: The Schaeffler Group has 133 years history when Mr. Fischer invited the ball grinder in 1883 which marked as the beginning of the rolling bearing industry. There are three key factors for Schaeffler's success: quality, technology and innovation. Schaeffler distinguishes itself through foresight and by thinking and acting in the long term. Schaeffler thus



identifies key trends at an early stage, invests in the research and development of new, future-oriented products, defines new technology standards, and makes them ready for volume production.

Schaeffler's manufacturing expertise and holistic quality management ensure a level of product quality that is significantly above the sector average. The "zero defects" principle is the standard and represents the stabilization of processes and continuous improvement. It serves to identify and eliminate weaknesses early on – and therefore prevent errors in the first place. Schaeffler has an extremely broad wealth of expertise in manufacturing and is one of the sector's technological leaders in numerous manufacturing areas, including cold forming, forging, and heat treatment.

Schaeffler has 6,700 employees at 17 R&D centers globally. With over 2,000 patent registrations per year, Schaeffler is Germany's second most innovative company according to German Patent and Trademark Office. Schaeffler's

expertise has been gained through years of experience. For example, the company has been at the forefront of innovative surface and coating technology. Schaeffler surfacing technology center develops the most reliable coating solution, while Schaeffler's acoustics network offers optimizations for every type of noise and vibration testing. The technology that is thus gathered from both the automotive and industrial fields are passed to customers through the company's competence network.





Multinationals in China: You mentioned about “Mobility for tomorrow”. Could you tell us more about it?

Dr. ZHANG YILIN: In a comprehensive study on mobility, Schaeffler has investigated customer demand and behavioral patterns to the year 2025 and identified developments in future mobility requirements in different regions of the globe. The study concludes that, despite continuing globalization, there is not one overall solution to the subject of mobility. The megatrends of globalization, urbanization, digitalization, scarcity of resources, renewable energies lead to growing requirements for affordable. Environmentally-friendly drives, urban and interurban mobility as well as the energy chain are the areas of focus, which Schaeffler is actively shaping by carrying out its own research and development in cooperation with its customers and business partners.

Schaeffler is a development partner with a comprehensive understanding of drive train systems both for vehicles with internal combustion engines and for hybrid and electric mobility solutions. Schaeffler's strength lies in its breadth of knowledge which encompasses not only the automotive sphere but also all other urban and inter-urban modes of mobility such as two-wheeled transport, rail and aviation. In the field of energy, Schaeffler is a development partner for both conventional and regenerative energy production as well as the most efficient possible use of applied energy through products with minimum friction.

"Mobility for tomorrow" is also being implemented in China. Supported by German colleagues, Schaeffler engineers in China have developed the China concept car using the P2 hybrid module and the e-Wheel Drive module. Based on a Chinese local passenger car, Schaeffler China concept car is a plug-in hybrid car with much less fuel consumption and much better driving functionality. The e-Wheel Drive is an advanced

solution that proposes to tackle the growing problems of urban traffic congestion and pollution. The motor, brake and cooling devices are integrated into the car's wheel rim, providing an in-wheel electric drive and achieving zero-emission travel.

Multinationals in China: What unique products and solutions is offered by Schaeffler in automotive and industrial fields?

Dr. ZHANG YILIN: Our main customer is the automotive industry, with around 70 percent of our sales. Schaeffler is a recognized development partner for the automotive industry with systems expertise for the entire drive train – this includes the engine, transmission, chassis, and accessory units in passenger cars and heavy trucks. Schaeffler offers a wide range of products that includes everything from energy-efficient solutions for conventional drive trains with internal combustion engines and products for hybrid vehicles up to components for all-electric vehicles. High-precision products from INA, LuK, and FAG contribute to lower energy consumption and emissions in vehicles without sacrificing driving comfort, safety, and enjoyment. Our customers include all renowned automotive manufacturers and well-known suppliers worldwide.

The Industrial Division supplies rolling bearing and plain bearing solutions and linear and direct drive technology under the INA and FAG brands for around 60 different industrial sectors via its worldwide organization with market proximity and application support service. The range comprises more than 225,000 products from miniature bearings only a few millimeters wide, e.g. for dental drills, to large-size bearings with an outside diameter of several meters, e.g. for wind turbines. The renowned "Aerospace" Business Unit of the Industrial Division manufactures high-precision bearings for aircraft, helicopters, and rocket engines, such as for the Airbus A 380 and the Boeing 787 Dreamliner. Special applications with high-



precision bearings, e.g. for medical technology, round out the portfolio.

The numerous activities of Schaeffler's Automotive and Industrial divisions relating to electric mobility are bundled together in the "eMobility Systems Division". The wide-ranging product portfolio already offers numerous solutions: The range extends from sensor bottom brackets for e-bikes, start-stop solutions, and hybrid clutches right up to electric drives.

Multinationals in China: What opportunities would Schaeffler see from "Made in China 2025"? What solutions does Schaeffler have for the “Industrial 4.0”?

Dr. ZHANG YILIN: Considering the mega trend of "Made in China 2025" and China's 13th Five-Year Plan, Schaeffler would have potential opportunities in sectors such as renewable energy (wind power), precision production machinery, medical devices, aviation, railway, power drive and the heavy industry, new energy vehicles and non-bearing services.

China will need at least 1 million CNC machineries in the next decade where bearing is one of the key components in it. China will invest 600-700 billion RMB in high speed railway



and rail transit every year. Through the “One Belt, One Road” program, China will also export its high speed railway to the countries along the One Belt and One Road. From 2016 to 2020, the newly installed wind power facilities around the world will be estimated to reach a capacity of 27 megawatts, of which 117 megawatts will be generated in China, accounting for 42% of the new facilities. We develop competitive products and solutions for the areas mentioned above.

Together with partners, Schaeffler has developed the "Machine tools 4.0" concept which connects existing technology, from sensors to the cloud, to new digitized components and

represents a real step towards digitized production. We are pursuing a specific digitalization strategy with the aim of providing data from the most diverse of processes via sensors, networking and analysis in order to be able to offer customers clear-cut added value. As a user of machine tools, this Industrial 4.0 initiative has a direct relevance in Schaeffler's own production. Schaeffler's activities in the field of machine tool digitalization provide the whole sector with the potential to convert opportunities and overcome challenges through close



collaboration between manufacturer, supplier and user.

Multinationals in China: Could you share us some practices of Schaeffler in corporate social responsibility?

Dr. ZHANG YILIN: Sustainable management and social responsibility have been integral parts of the Schaeffler Group's active corporate culture. Schaeffler places great emphasis on combining economic success with acting responsibly – towards customers, the environment, and employees. All manufacturing processes comply with strict legal and internal environmental protection requirements. All Schaeffler Group sites worldwide are certified in accordance with ISO 14001 or the even more stringent EMAS directive. This means that the Schaeffler Group plays a leading role when it comes to environmental protection on an international level.

We have set up a Schaeffler Hope School in China and send out volunteers to help students there. We also have training centers in each manufacturing bases in China where we have successfully introduced the dual-system education from Germany to China to cultivate talents both in theory and hands-on experience. One of the best practices is in Taicang. Together with Suzhou Chien-Shiung Institute of Technology and Tongji University, we launched the first "two-in-one" integrated bachelor's degree program in China. Thanks for this program, we were selected as one of "2015 Excellent CSR Practices of Foreign-invested Enterprises in China" and was titled "Best Community Promoter" by China Association of Enterprises with Foreign Investment.