

YOFCTODAY

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致我们的三十而立

2018年，注定是长飞发展史上具有里程碑意义的一年。

这一年4月，习近平总书记视察湖北时再次听取长飞汇报，查看了长飞最新自主研发的国际先进水平的光纤预制棒、光纤等产品，时隔5年，总书记对长飞依然印象深刻。

这一年5月，我们迎来了长飞30岁生日。在30周年庆典上，原信息产业部部长吴基传称赞长飞是中外企业合作的典范，是“引进—消化—吸收—再创新”的典范。

这一年7月，长飞成功登陆A股，成为中国光纤光缆行业和湖北省唯一一家“A+H”双资本运作的上市公司。

这一年1月，长飞再获国家科技进步二等奖，成为中国光通信行业唯一一家两次获得该奖项的企业。

这一年10月，长飞喜获2018年欧洲质量奖（欧洲质量奖为世界三大政府质量奖之一），长飞成为该奖项设立26年来的第一家获奖中国企业；

这一年12月，长飞“全光工业互联网平台应用项目”喜获国家工信部首批“工业互联网平台集成创新应用试点示范项目”，为湖北省唯一……

长飞1988年成立，1992年正式投产，2014年香港上市，2018年A股上市。自2016年底起，我们的光纤预制棒、光纤和光缆市场份额连续保持“全球第一”，从行业追赶者到行业领军者，提前实现了我们的“长飞梦”，见证了中国光通信产业的发展历程。

在武汉，在潜江，在兰州，在沈阳，在缅甸，在印尼，在南非……长飞高质量发展的种子从国内播撒向全球，一幢幢厂房如雨后春笋拔地而起，公司从最初的几十人发展到现在近五千人。

30年探索，30年奋斗，30年积淀。一代又一代的长飞人，用肯钻研、不服输的长飞精神，书写了我们跨越式发展的壮丽史诗。

时间是奋斗者筑梦的足迹。过去30年，我们踏石留印，抓铁有痕，交上了一份让时代满意的答卷。在2018年即将过去的时候，当我们回望这一年、回望长飞30年，相信在每一个人的内心，都有收获，有思考，有感悟，有成长。

独行快，众行远。感谢全体为实现“长飞梦”而奋斗的长飞人，也愿长飞大家庭的每个成员，继续相扶相持，同心同行，以客户为中心，致力于为信息传输与智慧联接提供优质的产品和解决方案，以更加优异的业绩回报投资者、客户和合作伙伴，以行业领先地位促进世界光通信产业的蓬勃发展，以振兴民族经济的使命感，迎接万物互联时代的到来！

新时代属于坚定者、奋进者、搏击者，也属于每一个为了梦想而打拼的长飞人。

以梦为马，不负芳华。

2019，让我们开启新征程，共创新未来！

长飞公司执行董事兼总裁



To the 30th Anniversary of YOFC

Year 2018 marks a milestone in the development history of YOFC.

In April of this year, General Secretary Xi Jinping once again listened to the report of YOFC during his inspection tour in Hubei, and reviewed the products independently developed by YOFC in conformance to the internationally advanced standards, such as preform and optical fibre. Five years after the last inspection, he is still impressed by YOFC.

In May, YOFC welcomed its 30th birthday. At the 30th anniversary celebration, Wu Jichuan, former Minister of the Ministry of Industry and Information Technology, praised YOFC as a model Chinese firm that cooperates with foreign enterprises and a model of technology "introduction, learning, incorporation, and innovation".

In July, YOFC was listed on the main board of Shanghai Stock Exchange, which made us the first A+H dual-listed company in Chinese optical fibre and cable industry as well as in Hubei Province.

In January, YOFC won the Second Prize of National Science and Technology Progress Award again, becoming the one and only enterprise of home optical communication industry winning the award twice.

Yet in October, YOFC obtained the EFQM Global Excellence Award 2018, which is one of the three major Government Quality Awards in the world. YOFC has become the first Chinese enterprise winning the award in the past 26 years since the establishment of the Award.

In December, YOFC's "All-Optical Industrial Internet Platform application project" was listed into the first batch of "pilot demonstration projects for Integrated Innovation of Industrial Internet Platform" launched by Ministry of Industry and Information Technology of the People's Republic of China and also the only one in Hubei Province……

Founded in 1988 and formally put into operation in 1992, YOFC was listed on the main board of Shanghai Stock Exchange in 2018 following its IPO on the Hong Kong Stock Exchange in 2014. Since the end of 2016, YOFC has maintained the largest market share in the global market of preform, optical fibre and cable manufacturing. Growing from a follower to an industry leader, YOFC has realized its dream ahead of schedule and witnessed the development history of China's optical communication industry.

With the presence in Chinese cities like Wuhan, Qianjiang, Lanzhou and Shenyang, and overseas markets in Myanmar, Indonesia and South Africa, YOFC has gained global reputation for high-quality development. Factories have mushroomed and the staff number has increased from a few dozen to nearly 5,000 now.

With 30 years of exploration, struggle and efforts, generations of YOFC people, following the enterprise spirit highlighting the willingness to learn and progress and perseverance, have written a glorious epic in YOFC's leapfrog growth.

Time is the footprints left by strivers when fighting for their dreams. Over the past 30 years, YOFC has taken firm steps and delivered a set of satisfactory results. In the waning days of 2018, when looking back to the growth of YOFC in this year and in the past 30 years, we are confident that everyone in YOFC has something harvested, reflected, felt, and progressed.

As a saying goes "If you want to go fast, walk alone; and if you want to go far, walk together", it is all the staff in YOFC that pushes YOFC going forward further and further. Here, YOFC would like to thank all members of YOFC who strive for the realization of the "dream of YOFC". Looking into the future, YOFC hopes that all members can support one another and work together to provide quality and customer-centric products and solutions for information transmission and intelligent connection. As such, YOFC will deliver better performance for investors, customers, and partners, and promote the thriving development of world optical communication industry with its leading position in the industry. It will bear the mission of revitalizing national economy and welcome the arrival of the Internet of Everything!

The new era belongs to those who dare to forge ahead and fight with determination, as well as to all members of YOFC who strive for their dream.

In the future, let's run with our dreams and live in the moment.

In 2019, let's start a new journey and create a new future together!

Executive Director and President of YOFC

1月

● 强强联合, 长飞携手宝胜打造海缆基地

Strong Union, YOFC Build a Cable Base with Baosheng

1月3日, 长飞公司与宝胜科技创新股份有限公司签署了海缆项目合资协议。双方海缆项目合资协议的成功签约, 将打造出国内最大、世界领先的海缆制造与服务基地, 推动长飞公司将市场从陆地拓展至海洋, 打造横跨通信工程和电力工程领域的系统集成和咨询服务能力。

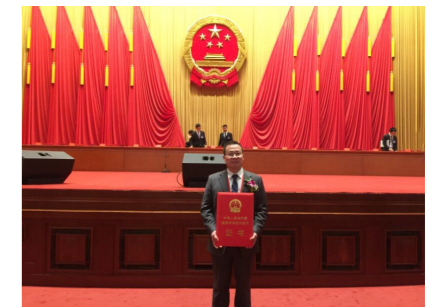


On Jan. 3rd, 2018, YOFC and Baosheng Science and Technology Innovation Co., Ltd. signed the sea cable project joint venture agreement. The two parties's signature on sea cable project will create the domestic largest and world's leading marine cable manufacturing and service base to promote YOFC expand the market from the land to the marine and build across the system in the field of communication engineering and power engineering integration and consulting service ability.

● 长飞公司荣获 2017 年度国家科学技术进步二等奖

YOFC won the 2017 national scientific and technological progress second prize

1月8日, 2017年度国家科学技术奖励大会在人民大会堂举行。长飞公司和中国联合网络通信集团有限公司联合申报的“新型光纤制备技术及产业化”项目荣获国家科学技术进步二等奖。



On Jan. 8th, 2017, the national science and technology reward conference was held in the great hall of the people. YOFC and China United Network Communications Group Co., Ltd declared "new type of fibre production technology and industrialization" project and it won the second prize of the national science and technology progress.

● 长飞公司与联想集团签署工业互联网联合实验室合作协议

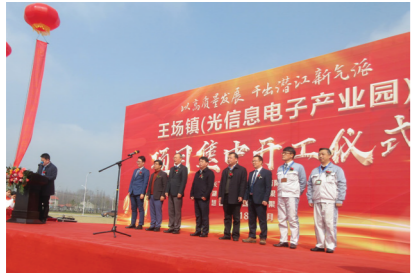
YOFC and Lenovo Group signed a cooperation agreement on industrial internet joint laboratory

1月9日, 长飞公司与联想集团举行“(长飞-联想)工业互联网联合实验室”签约揭牌仪式, 这标志着双方今后将共同推动工业互联网技术在相关行业的深度融合与应用, 让工业智能进一步推动工业转型与升级。



On Jan. 9th, YOFC and Lenovo, China held the signing ceremony of "(YOFC Lenovo) industrial internet joint laboratory", which indicates that both sides will jointly promote the in-depth integration and application of industrial internet technology in related industries in the future so that the industry intelligence can further promote industrial transformation and upgrading.

2月



长飞信越公司二期项目正式开工

YOFC (ShinEtsu) officially started the second phase of the project

2月28日,长飞信越(湖北)光棒有限公司(以下简称“长飞信越公司”)二期项目开工仪式在湖北省潜江市江汉盐化工业园隆重举行,这标志着长飞潜江科技园步入新的发展阶段。

On Feb. 28th, YOFC (ShinEtsu) the second expansion project construction ceremony was held in Jiangnan Yanhua Industrial Park, Qianjiang City. It marked YOFC (Qianjiang) Science and Technology Park has stepped into a new development period.



长飞印尼光通信有限公司隆重开业

The opening ceremony of YOFC (Indonesia) Optical Communications Company Ltd. was held

2月28日,长飞印尼光通信有限公司在印度尼西亚西爪哇省卡拉旺市隆重举行了开业典礼。长飞印尼光通信公司是长飞公司在海外的第三家光缆制造合资企业,并在不到8个月的时间内提前实现了投产,续写了当年签约、当年动工、当年投产的记录。

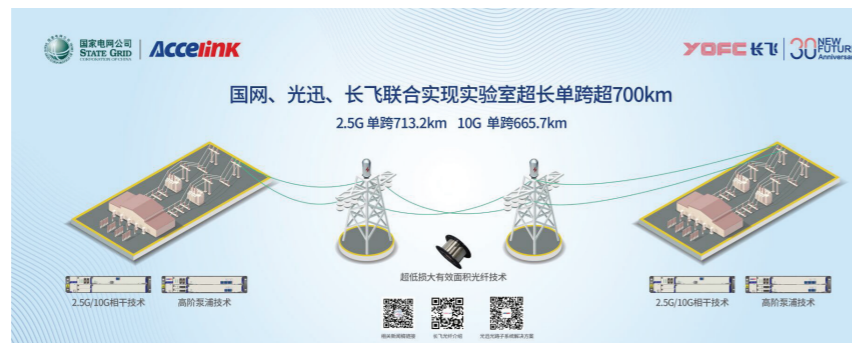
On Feb. 28th, the opening ceremony of YOFC (Indonesia) Optical Communication Co.,Ltd. was held in Indonesia. YOFC (Indonesia) Optical Communication Co.,Ltd. is the third optical cable manufacturing joint venture enterprise overseas. It launched the factory construction of optical cable in June 2017 and to put into production in less than 8 months, keep the record of signing the agreement, construction and putting into production within one year.

3月

长飞公司新型光纤刷新单跨距无中继光传输世界纪录

YOFC's new optical fibre set a new world record for single span relay optical transmission

3月,长飞公司、国家电网公司信息通信分公司与武汉光迅科技股份有限公司共同宣布:采用长飞公司超低损耗大有效面积G.654.E“远贝®超强”光纤和光迅科技E-ULH“增强型超长单跨距无中继光路子系统”的三方合作项目,成功实现了10G系统665.7km和2.5G系统713.2km的单跨距无中继实验室传输测试,分别刷新了原单跨距2.5G和10G系统无中继光传输的世界纪录。

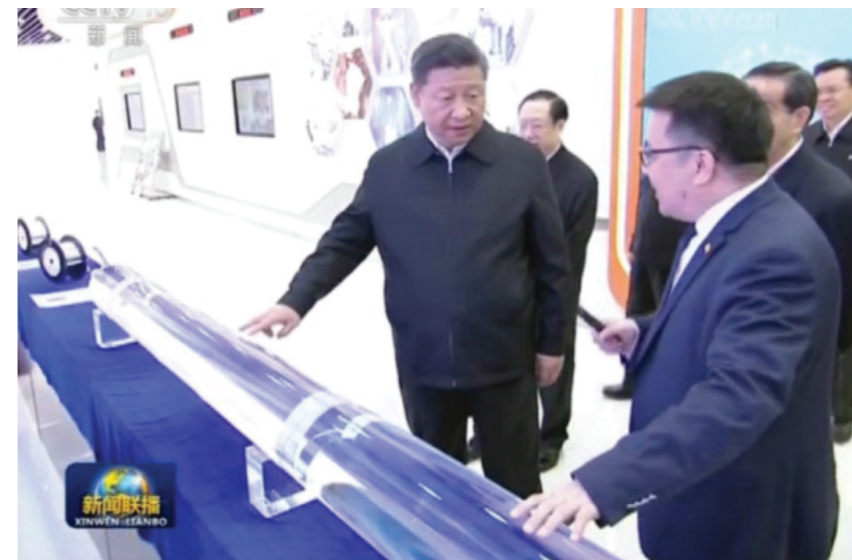


In March, YOFC, SGCC information and communication branch and Wuhan Optical Communication Science and Technology Co., Ltd. announced together to adopt YOFC ULL G.654E fibre and optical communication E-ULH single span relay optical road system cooperation project to successfully realize 10G system 665.7km and 2.5G system 713.2km single span relay laboratory transmission test and had a new world record.

4月

习近平总书记听取长飞公司汇报:核心技术要牢牢掌握在自己手中

General Secretary Xi Jinping briefed by YOFC: The core technology must be in our own hands firmly



4月26日上午,习近平总书记在湖北视察之行中,专程来到东湖高新区视察企业创新发展情况,其间听取了长飞公司的汇报,查看了长飞最新自主研发的国际先进水平的光纤预制棒、光纤等产品实物。时隔5年,总书记对长飞公司依然印象深刻。长飞公司执行董事兼总裁庄丹向总书记汇报了长飞公司近年来发展情况,整个过程中,总书记仔细聆听,频频点头,尤其对涉及企业自主创新的内容,给予最多关注。

On the morning of April 26, General Secretary Xi Jinping specially visited Wuhan East Lake High-tech Development Zone to inspect enterprises' innovation development and was briefed by YOFC, during his inspection tour in Hubei. He reviewed the latest products independently developed by YOFC up to international advanced level, such as preforms and optical fibres. Five years later, Xi Jinping was still impressed by YOFC. Zhuang Dan, Executive Director and President of YOFC, reported YOFC's recent development to Xi Jinping. Xi Jinping listened carefully and kept nodding to express his agreement. Xi Jinping paid the most attention to the parts concerning enterprises' independent innovation.

长飞公司工程师钟升荣获“信息通信行业工匠”荣誉称号

Zhong Sheng, engineer of YOFC, won the honorary title of Information Telecommunication Industry craftsman

4月,作为15家信息通信行业获奖企业中唯一的制造业代表,长飞公司工程师钟升荣获“信息通信行业工匠”荣誉称号。

In April, as the only manufacturing industry representative in the 15 information communication industry rewarding enterprises, YOFC engineer Zhong Sheng won the honorary title of communication industry craftsman.



5月

感恩有您 共创新未来——热烈庆祝长飞公司成立三十周年

Thanks for having you to innovate the future together——warmly celebrate the 30th anniversary of the YOFC

2018年5月30日，感恩有您 共创新未来——长飞公司成立30周年庆典盛大召开，邀请了众多政府领导、合作伙伴、新老朋友前来，共同庆祝长飞公司30岁生日，分享长飞公司成立30周年的喜悦与精彩。

作为此次30年庆典活动的重要组成部分，长飞公司还在庆典当天举行了智能制造研究院成立仪式、资本协同战略合作签约仪式、新企业标识发布仪式。这意味着，长飞公司自2018年5月30日起，将以全新的面貌，携手更多新的合作伙伴，探索新的业务领域，打造新的盈利增长点，与业界各方一起再绘新未来！

On May 30th, 2018, thanks for having you to innovate the future together. YOFC 30th anniversary of the founding of the company held a grand celebration. In the 30th anniversary celebration, YOFC invited many government leaders, partners, new and old friends to celebrate the 30th birthday of YOFC and enjoy the delightful moment.

As the 30 years is an important part of the celebration activities, YOFC also held an establishment ceremony of smart manufacturing institute and capital strategy cooperation signing ceremony and new logo release ceremony, which means that YOFC will explore new business to create new profit point with new look and create a new future with all parties.

长飞公司国家重点实验室获评优秀，在信息领域位居首位

YOFC state key laboratory was rated as excellent, ranking first in the field of information

5月30日，国家科技部正式公布了企业国家重点实验室评估结果，光纤光缆制备技术国家重点实验室被评为“优秀类国家重点实验室”，并在信息领域位居首位。

On May 30th, the ministry of the national science and technology officially issued the appraisal results on the national key laboratory and the State Key Laboratory of Optical Fibre and Cable Manufacture Technology was rated as excellent national key laboratory and ranked first in the field of information.

7月

长飞公司A股成功上市，系中国光纤光缆行业和湖北省首家A+H股上市企业

The successful A-share listing of YOFC is the first A+H dual-listed company in Chinese optical fibre and cable industry as well as in Hubei Province

2018年7月20日，长飞公司成功在上海证券交易所挂牌上市，正式成为国内光纤光缆行业首家、湖北省首家A+H股两地上市的企业，开启了跨越式发展的全新征程。

On July 20th, 2018, YOFC was successfully listed on the Shanghai stock exchange, officially becoming the first enterprise in the domestic optical fibre and cable industry to be listed on both sides of A+H shares in Hubei province, which started a new journey of development.



8月

- 长飞光纤公布二零一八年中期业绩: 净利润大增 44%, 市场前景持续向好



YOFC announced 2018 interim results: net profit increased 44%, the market outlook continues to be good

2018年8月24日,长飞公司发布了长飞光纤及其附属公司2018年中期业绩,业绩报告显示,2018年上半年长飞光纤营业收入约为56.32亿元人民币,较2017年同期增长约21.2%;归属于上市公司股东的净利润约为8.09亿元人民币,较2017年同期大幅增长约44.3%。

On Aug. 24th, 2018, YOFC released YOFC and its subsidiaries business results to show a good transcript to the investors. According to the performance report, the operating income of YOFC in the first half of 2018 is about 5.632 billion yuan, which is about 21.2% higher than that in the same period of 2017, the net profit belonging to the shareholders of the listed company is about 809 million yuan, a sharp increase of about 44.3% compared with the 2017 same period.

9月

- 长飞公司与湖北铁塔公司签署合作协议



YOFC signed a cooperation agreement with Hubei Tower Company

9月5日,长飞公司与中国铁塔股份有限公司湖北分公司签署合作协议,双方本着“资源共享、优势互补、合作共赢、共促发展”的原则,整合各自资源优势,致力于全面、长期和稳定的合作伙伴关系,在业务开拓、资源共享等多领域推进深层次合作。

On Sept. 5th, YOFC signed a cooperation agreement with Hubei Tower Co., Ltd. Hubei Branch, which is committed to comprehensive, long-term and stable cooperative partnership and promotes in-depth cooperation in multi areas.

- 长飞公司执行董事兼总裁庄丹出席2018夏季达沃斯论坛

Zhuang Dan, Executive Director and President of YOFC, Attended 2018 Summer Davos Forum

9月18日至20日,2018夏季达沃斯论坛在天津梅江会展中心隆重举行。作为光纤光缆行业的领军人物,长飞公司执行董事兼总裁庄丹博士出席本届夏季达沃斯论坛,与各界精英一道,探讨长飞公司及中国光通信产业在全球数字化转型浪潮中的战略机遇。

On Sept. 18-20, 2018 Summer Davos Forum was held in Meijiang Convention and Exhibition Center of Tianjin. As a leader in optical fibre and cable industry, Dr. Zhuang Dan, Executive Director and President of YOFC, attended the 2018 Summer Davos Forum. He exchanged ideas with other industrial elites on strategic opportunities YOFC and China's optical communication industry face in the global trend of digital transformation.



10月

- 长飞公司王瑞春入选科技部2017年创新人才推进计划



Wang Ruichun from YOFC was selected into the 2017 innovation talent promotion plan of the ministry of science and technology

近日,科技部公布2017年创新人才推进计划入选名单。长飞公司研发中心原总经理、长飞光纤潜江有限公司总经理王瑞春入选中青年科技创新领军人才,是国内光纤光缆行业唯一一位获此殊荣的科技创新人才,也是湖北省唯一入选的企业代表。

Recently, the ministry of science and technology announced the list of innovative talents promotion program in 2017. Wang Ruichun, former general manager of R&D Center of YOFC and general manager of YOFC (QianJiang) Co., Ltd. was selected as the leading talent for scientific and technological innovation of young and middle aged people. He is the only scientific and technological innovation talent who won the honor in the domestic optical fibre and cable industry and the only enterprise representative selected in Hubei Province.

- 长飞公司入选2018“金翼奖”港股通公司价值实力排行榜

YOFC entered the Power Ranking of 2018 Golden Wing Award for Most Valuable Hong Kong Stock Connect Companies

10月19日,长飞公司入选2018“金翼奖”港股通公司价值实力排行榜!

On Oct. 19th, YOFC entered the Power Ranking of 2018 Golden Wing Award for Most Valuable Hong Kong Stock Connect Companies.



- 长飞公司喜获2018年欧洲质量奖 成为第一家获奖中国企业

YOFC won the 2018 European Quality Award and became the first Chinese enterprise to win the award

北京时间10月19日凌晨,长飞公司荣获由欧洲质量管理基金会(EFQM)颁发的“2018 EFQM全球卓越奖”。今年全球只有8家企业获奖,长飞公司是欧洲质量奖设立以来首个获得该奖项的中国企业。

In the early morning of Oct. 19th, Beijing time, the 2018 European quality award conference was held in hofburg Palace, Vienna. YOFC was awarded the “2018 EFQM global excellence award” issued by the European Quality Management Foundation (EFQM). Only eight companies have won awards this year and YOFC is the first Chinese company to win the European quality award since its inception.



11月



- 长飞荣获华为“2018 全球核心供应商金奖”

YOFC won Huawei “2018 Global core supplier golden award”

11月7日,长飞公司荣获华为“2018 全球核心供应商金奖”,成为本次大会获此殊荣的唯一一家光缆供应商。

On Nov. 7th, YOFC won Huawei 2018 global core supplier gold award and became the only optical cable supplier that won this special award at the conference.

- 连续三年荣获《彭博商业周刊中文版》“年度上市企业”大奖,长飞用业绩诠释实力

Won the annual listed enterprise award of Bloomberg business week Chinese edition for three consecutive years, YOFC explained its strength with its performance

11月9日,长飞公司凭借多个维度的优秀表现荣获“年度上市企业”大奖,这是长飞公司连续三年斩获该奖项,并同时获得“最佳创新变革奖”及“最佳业绩表现奖”。

On Nov. 9th, YOFC with multiple dimension of outstanding performance won the annual public companies awards, this is YOFC new award for three consecutive years and also won the most innovation award and best performance award.



- 长飞斩获 2018 中国光通信发展与竞争力论坛四项大奖

YOFC won four awards of BBS in the development and competitiveness of China's optical communication in 2018

11月20日,长飞公司一举斩获“中国光纤光缆最具竞争力企业10强”(第一名)、“全球光纤光缆最具竞争力企业10强”(第二名)、“中国光通信市场最具品牌竞争力企业10强”(第五名)、“2018 中国光通信最具‘工匠精神’企业大奖”四项荣誉。

On Nov. 20th, 2018, YOFC gains the most competitive enterprises in China top one award, global cable top ten most competitive enterprises (second prize) and optical communication market of China's most competitive brands in top 10 enterprises (fifth) 2018 and China optical communication craftsman spirit enterprise award.



12月

- 长飞光纤成功入选上证 380 指数样本股

YOFC Selected as Sample Stock for SSE 380 Index

12月3日,上海证券交易所和中证指数有限公司联合宣布,调整上证50、上证180、上证380等指数样本股,长飞光纤(股票代码:601869.SH)入选上证380指数。

Shanghai Stock Exchange (SSE) and China Securities Index Co., Ltd. (CSI) would adjust the sample stocks for SSE 50, 180, 380 and other indices and YOFC (SHA: 601869) was selected as a sample stock for SSE 380 Index, SSE and CSI announced jointly on December 3.

- 长飞公司作为中国光通信唯一代表,讲述改革开放时代传奇

As the only representative of the optical communication industry of China, YOFC represents a legend in reform and opening-up

长飞公司作为中国光通信行业的唯一代表庄重亮相“伟大的变革——庆祝改革开放40周年大型展览”,向全世界讲述了中国光通信行业从零起步,从小到大,从跟随到引领,从引进吸收到创新输出,实现从依赖进口国外技术设备到制备工艺和设备完全国产自主,并开始向国外反向输出设备的跨越式发展历程。

As the only representative from the optical communication industry of China, YOFC participated in the major exhibition commemorating the 40th anniversary of China's reform and opening-up, telling the world how the optical communication industry of China expanded from scratches, from small to large, from a follower to a leader, and from learning to innovating, how it developed from relying on foreign technology and equipment to fully independent production, and how it achieved the leap-forward development of exporting equipment to foreign countries.



2018 世界光纤光缆大会上， 长飞与业界同仁共话全球光纤互联新未来

◎ 本刊编辑部



11月5日-7日，2018世界光纤光缆大会在浙江杭州举行，这场世界光纤光缆产业链首屈一指的会议，聚集了逾700位电信网络高管、光纤光缆制造商、解决方案提供商和技术专家等共襄盛举，共话全球光纤互联新未来。

本届世界光纤光缆大会上，长飞公司执行董事兼总裁庄丹作了题为《创新驱动发展 引领全球光纤光缆行业共创繁荣》的主题演讲。主题演讲结束后，庄丹还与其它光纤光缆企业的总裁们汇聚一堂，就行业的发展现状和前景展开了精彩的思想碰撞。

以5G、AI、云计算、物联网等为代表的新一代ICT技术，不仅可以加快信息的流转速度、增强人们的生活愉悦度，更重要的是，它将极大推动人类社会向前发展。当下，5G成为全球科技的关注热点，从设备商到运营商再到终端商争相布局，而光纤光缆正在成为这场未来竞争的战略资源。对于5G网络建设，长飞公司提前布局，目前已能提供从骨干网络、城域网到接入网的光纤基础网络全套解决方案。

近年来长飞公司作为行业领军企业，一直致力于推动中国光纤光缆行业的整

体发展，使之成为全球行业的“四个中心”——研发中心、制造中心、营销中心、咨询与服务中心。早在2015年，长飞公司与CRU（英国商品研究所）合作，首次将亚太光纤光缆大会引进中国；2016年世界光纤光缆大会成功举办，这一全球性会议落地中国，为国内光纤光缆厂商与全球行业人士搭建对话平台，构建光纤光缆行业发展共同体。

YOFC and Industrial Peers Envision the New Future of Global Fibre Interconnection at the World Optical Fibre & Cable 2018

◎ The Editorial

On November 5-7, the World Optical Fibre & Cable 2018 was held in Hangzhou, Zhejiang Province. The top-notch event in global fibre and cable industry chain brought together 700-plus executives of telecommunication network, fibre and cable manufacturers, solution providers, and technical professionals to imagine the new future of global fibre interconnection.

At the event, Zhuang Dan, Executive Director and President of YOFC, delivered a keynote speech titled "Innovation Drives Development and Leads to Common Prosperity of Global Fibre and Cable Industry". After the keynote speech, Zhuang Dan and CEOs of other fibre and cable enterprises exchanged ideas on the development status quo and outlook of the industry.

The new generation ICTs represented by 5G, AI, cloud computing, and IoT, will accelerate information transmission and bring more pleasure to people's life, and more importantly, will greatly advance the progress of human society. At present, 5G has

become the focus of attention in global technology field, with equipment suppliers, operators, and terminal operators scrambling to embrace the new business. As such, fibre and cable has become a strategic resource in future competition. YOFC has taken the preemptive opportunities to engage in 5G network construction. Currently, YOFC is capable of providing a whole package of solutions to basic fibre network, ranging from backbone network, metropolitan area network to access network.

In recent years, as a leading player, YOFC has been committed to boosting the overall development of China's

fibre and cable industry, and worked to build itself into a global center in R&D, manufacturing, marketing, and consultation & service of this industry. As early as in 2015, YOFC cooperated with the Commodity Research Unit (CRU) to introduce CRU's APAC Optical Fibre & Cable Conference to China. The World Optical Fibre & Cable 2016 was held with success, making the international conference settle down in China. As a result, a dialog platform has been built for domestic fibre and cable manufacturers to communicate with global insiders, in an effort to shape a development community for fibre and cable industry.



2018CRU 直通车

CRU Through Train 2018

5G 时代的光纤通信

Optical fibre communications in 5G era

5G 将要求更密集的基站,而且 5G 基站的密集组网需要大量光纤,特别是 5G 基站数将是 4G 的 4-5 倍,带宽约为 4G 的 10 倍。未来,光通信发展将面临六大机遇:中国继续推动提速降费将加快光纤宽带接入的升级;中国各地的智慧城市建设推动 FTTH 大规模部署;中国在 2020 年前农村全部脱贫将加快农村光纤建设;中国 2020 年将商用 5G,5G 基站数将是 4G 的 4-5 倍,而且 10 倍的带宽,对光网络提出更高需求;工业互联网的建设开拓企业光网络建设市场;“一带一路”战略将拉动国际光缆干线的建设。

What comes with 5G era will be the demand for denser base stations, and then a great deal of optical fibre to support this denser 5G base station network. Significantly, the number and the bandwidth of 5G base stations will respectively quadruple or quintuple and decuple those of 4G base stations. Looking ahead, optical communications will be presented with six opportunities in its development course: China's continuous efforts to increase the speed and cut the fees will accelerate the upgrading of optical fibre broadband access; China's nationwide efforts to construct smart cities will advance the large-scale development of FTTH; China's goal to lift its rural areas out of poverty by 2020 will accelerate the construction of optical fibre in rural areas; China's target to quadruple or quintuple the number and decuple the bandwidth for 5G base stations compared with 4G ones will impose higher requirements on optical networks; China's construction of industrial networks will develop the market for corporate optical network construction; China-proposed Belt and Road Initiative will drive the construction of global optical trunk cables.

中国工程院院士邬贺铨

Wu Hequan, Academician of the Chinese Academy of Engineering

光缆市场趋势

Market trends of optical cables

5G 网络建设将决定 2018 年后光纤市场的发展。从 2018 年 1 月开始中国运营商将大规模的 3G、4G 和 FTTH 建设压缩为 10 年;中国从 3G 向 4G 的发展速度快于其它国家,但这种加速周期并不保证 5G 网络建设;中国的 FTTH 网络具有很高的“使用率”(签约用户比例);未来的住宅建设将意味着,新网络每年通过的家庭数量少于过去五年。从 2009 年到 2018 年,光纤和光缆消费的快速增长引发了复杂的合作关系、供应合同、OEM 协议、私人标签协议以及国内公司之间的其它合作;短缺的结束和需求增长的减速将导致更多的竞争和可能的行业重组。

5G network construction will play a decisive role in the development of optical fibre market in coming years after 2018. Since January 2018, Chinese communication operators has squeezed their large 3G, 4G and FTTH construction projects into a ten-year timetable; although China has overtaken other countries in the upgrading from 3G to 4G, the accelerated timetable cannot promise the construction of 5G network; China's FTTH network registers a very higher "utilization rate" (the proportion of subscribers); future residential construction will mean the annual number of families approved by the new network is less than that of past five years. From 2009 to 2018, the swift rise in optical fibre and cable consumption has triggered complicated partnerships, supply contracts, OEM agreements, private label agreements and other cooperation between domestic enterprises; the end of shortage and the deceleration of demand increase have resulted in more competition and possible industrial reshuffle.

CRU 首席分析师 Richard Mack

Richard Mack, Chief Analyst of CRU

光纤市场供需动态

Supply-demand dynamic of optical fibre market

自 2010 年初以来,中国决定了全球光纤光缆需求增长的步伐。2018 年,全球安装的光缆总量将达到五亿四千二百万芯公里,其中,中国占了 58%。中国移动是确定 2018 年需求的关键变量。如果中国移动消费量与计划相同,全球需求将增加 2800 万芯公里。美国市场在 2017 年底和 2018 年初少数大客户订单低于预期,但 Verizon 高密度网络安装计划将有助于美国的需求增长。西欧的需求保持强劲。法国的光缆需求将在 2018 超过 1300 万芯公里,成为世界第四大市场。印度运营商正在加紧建设 FTTH,这也导致亚太地区的需求增加。

Since the beginning of 2010, China has set the increase pace of global optical fibre and cable demand. In 2018, the global installed optical fibre core kilometrage reached 542 million, and China accounted for 58%. China Mobile is a key variable in deciding the demand of 2018. If China Mobile meets its consumption target, global demand will increase by 28 million core kilometers. In late 2017 and early 2018, the orders of a handful of big clients were lower than expectation in the United States, but Verizon's high-density network installation plan is expected to act as a stimulus to demand increase in America. Meanwhile, the demand remains vigorous in West Europe. Optical cable demand in France has exceeded 13 million core kilometers by 2018, making France world's fourth largest market. Communication operators in India are accelerating FTTH construction, which also results in the demand increase in the Asia-Pacific.

CRU 高级分析师潘裕亚

Pan Yuya, Senior Analyst of CRU

创新驱动发展 引领全球光纤光缆行业共创繁荣

Innovation as a driving force and a way forward to boom global optical fibre and cable sector

当前，全球电信投资建设直接带来光纤光缆市场的强劲需求，5G时代的来临，物联网、无人驾驶、VR等新技术的发展，更将驱动光纤光缆行业持续旺盛。在这样的大背景下，长飞致力于从规模增长的量变到可持续发展的质变，推动全球光纤光缆行业和谐发展。在技术领域，长飞已经自主掌握三大预制棒工艺，潜江工业园成为全球最大预制棒基地，而且是绿色制造的基地；长飞还在全球率先推出OM5多模光纤。在业务创新领域，长飞正在向综合解决方案提供商迈进。在管理创新上，长飞引入的卓越绩效模式正在逐渐呈现效用。长飞公司成立30年来，一直着眼于技术的前沿，不遗余力地培养创新能力，未来，长飞公司不仅继续深耕棒纤缆主业，还将进一步拓展相关多元化业务，向综合解决方案提供商迈进，携手各行业客户实现面向未来的数字化转型，与业界伙伴共同创造下一个繁荣的光纤光缆30年。

Currently, the global telecommunication investment and construction directly leads to vigorous demands in optical fibre and cable market. The upcoming 5G era, together with the development of IoT, autonomous driving, VR, and other new technologies, will further contribute to the boom of optical fibre and cable sector. Against such a backdrop, YOFC is committed to a shift from quantitative change that focuses on scaling up to qualitative change that focuses on sustainable development, in a bid to drive the benign growth of global optical fibre and cable sector. As to technology, YOFC has successfully and independently developed three fibre preform production processes, making YOFC Qianjiang High-tech Industrial Park globally largest and notably green fibre preform production base; YOFC has also taken the global lead in rolling out OM5 multimode fibre. As for business innovation, YOFC is on the track towards a portfolio solution provider. With regards to management innovation, YOFC's excellent performance mode is taking effect. Over the past 30 years since its inception, YOFC has always been on the cutting edge of technology and made strenuous efforts to develop innovation capacity. Down the road, YOFC will continue to consolidate its presence in the main businesses of optical fibre preform, fibre, and cable. Meanwhile, it will diversify its businesses to become a portfolio solution supplier, work alongside its clients of various industries to achieve the future-oriented digital transformation, and partner with industrial peers to create greater prosperity of optical fibre and cable industry in the coming 30 years.

长飞公司执行董事兼总裁庄丹

Zhuang Dan, Executive Director and President of YOFC

长飞国重共襄 ACP 世界学术盛会，研究成果领跑全球同行

◎ 国家重点实验室 | 熊良明

近日，2018 亚洲光纤通信与光电国际会议 (Asia Communications and Photonics Conference, ACP 2018) 在杭州开元名都大酒店隆重举行，来自全球三十多个国家和地区的近 1000 名参会代表齐聚一堂，共襄这一学术盛宴。

本届大会由中国计量大学、浙江大学联合长飞公司光纤光缆制备技术国家重点实验室（以下简称“长飞国重”）、阿里巴巴集团等共同组织举办，长飞公

司技术总监、国重主任罗杰教授等任大会技术主席。在本次学会上，长飞国重作了 7 个 Oral 报告，所作报告是全球同行中最多的。7 个研究报告主要围绕光纤技术研究新进展、先进的长距离通信光纤技术、多芯光纤技术、多模光纤技术、少模光纤及其应用技术、以及空分复用光纤通信技术等，并首次报道了最低损耗为 0.152 dB/km 的少模光纤技术，这是迄今为止所公开报道的少模

光纤最低损耗水平。会议论文由美国光学学会 (OSA) 在线出版，EI 收录。

会议同期，光纤光缆制备技术国家重点实验室还举办了长飞专题“Applications of New Optical Fibers in Communication and Sensing”的国际学术研讨会。会议邀请了来自中国联通、中国电信、中国移动、中国信息通信研究院、美国、新加坡、上海交大和上海大学等的 9 位专家学者作了产业前沿技术研究报告。

会议现场同时举办了光电产品展览，长飞公司重点展示了最新研发的高速光纤传感解调仪与多参量监测应用系统、以及高速通信、大广角耦合用光学元件等，吸引了包括美国 Bell 实验室 Rene-Jean Essiambre 博士等众多与会嘉宾的兴趣，通过技术交流，有效建立了良好的合作意向。会议的召开受到国内外同行的广泛关注和参与，参会人数创造历史新高，会议组织工作获得了国内外参会代表的一致好评。



Spearheading the Industry with Great Research Achievements: YOFC State Key Laboratory of Optical Fibre and Cable Manufacturing Technology Co-hosts the ACP 2018

◎ YOFC State Key Laboratory | Xiong Liangming

Recently, the Asia Communications and Photonics Conference (ACP 2018) was held in New Century Grand Hotel Hangzhou. Nearly 1,000 delegates from 30-plus countries and regions were brought together for the academic event.

The event was co-hosted by China Jiliang University, Zhejiang University, YOFC State Key Laboratory of Optical Fibre and Cable Manufacturing Technology (hereinafter referred to as "YOFC State Key Laboratory"), Alibaba Group, and other institutions. Professor Luo Jie, Technical Director of YOFC and Director of YOFC State Key Laboratory, and others acted as technical chairmen of the Conference. At the event, YOFC State Key Laboratory made seven oral presentations, the largest number among its global peers. The seven presentations mainly focused on the latest developments of research on

optical fibre technologies, including long-distance communication optical fibre, multi-core fibre, multimode fibre, few-mode fibre and its applications, and SDM optical fibre communication. YOFC also released its few-mode fibre technology with a minimum loss 0.152 dB/km for the first time, the lowest loss of few-mode fibre reported publicly up to date. The papers were published online by the Optical Society of America (OSA) and included by EI.

During the proceedings of the Conference, YOFC State Key Laboratory hosted an international seminar themed "Applications of New Optical Fibres in Communication and Sensing". The seminar brought together nine experts and scholars from China Unicom, China Telecom, China Mobile, China Academy of Information and Communications Technology, Shanghai Jiaotong University, Shanghai

University, and also from the US and Singapore.

The photoelectric products exhibition was also held at the venue of the seminar. YOFC showcased its newly developed high-speed optical fibre sensing interrogator, multi-parameter monitoring application system, and optical elements for high-speed communication and wide-angle coupling, which drew the attention of Dr. René-Jean Essiambre from Bell Laboratories, the US, and many other guests. After technical communication, they expressed their intentions to build partnership. The seminar aroused wide concern from people in the same trade at home and abroad, with a record high number of attendees. The organizers of the seminar were also praised by domestic and overseas attendees for their excellent work of organization.

“学习共享 助力共赢” 长飞集团人力资源大会圆满举办

◎ 战略中心 | 曾云飞



近日,由长飞公司人力资源中心主办的“长飞集团人力资源大会”在汉隆重召开。围绕“学习共享 助力共赢”这一主题,长飞公司人力资源中心及来自海内外近30多名长飞分、子公司人力资源负责人齐聚一堂,就近年来总部与各分、子公司人力资源相关工作进行分享、沟通并针对明年新形势下的集团人力资源发展与提升展开充分研讨。

长飞公司执行董事兼总裁庄丹发表讲话,他表示,近一年来,总部人力资源

中心与分、子公司的人力资源同仁为长飞集团的发展做出了自己的贡献,成果显著。未来市场与行业的变化,需要长飞人力资源在工作执行上与集团战略目标达成高度一致,同时人力资源要充分挖掘与发挥每个员工的积极性,助力长飞不断发展。

长飞公司人力资源总监周焱珺为本次大会作主题报告,她指出,“学习共享 助力共赢”是本次大会的主旨,同样也是公司人力资源中心与各分、子公司共

同的使命与目标;分享了近一年来,长飞公司人力资源中心在组织架构、绩效管理、人力资源预算、职级与岗位、内部课程开发、任职资格、人才发展等多方面的项目成果与经验。

长飞集团人力资源致力于构建低成本、高质量的人力资源体系。2019年,企业经营环境将发生变化,在新的业务形势下,公司主营业务的降本增效、新业务的快速拓展、职能部门的平台能力提升是公司面临的发展关键。集团人力资

源要统一思想、苦练内功，给予业务发展以有力支撑，进而切实提高公司人力资源管理水平，为公司的战略、经营和管理提供保障。

为期两天的“长飞集团人力资源大会”中，长飞公司人力资源中心与各分、子公司人力资源就总部与分子公司协同，培训资源共享等进行充分沟通与探讨，多家分、子公司分享了最佳实践案例。最

后，与会全体代表以“决胜疆场，气贯长虹”的决心与气势高歌《中华男儿》，积极迎接未来机遇和挑战。

在万象更新的全球化商业环境中，长飞公司人力资源唯有通过自身不断地顺应外部环境变化，方能做好充分准备，应对挑战。一年来，长飞人力资源通过构建强有力的流程和工具，促进与推动员工能力的开发及管理

接公司战略、文化、核心竞争力，通过不断地导入外部先进的方法论和最佳实践，并向行业内以及跨界的标杆和先进企业学习，使得人力资源系统能够有效地运行，进而不断优化。秉承“公平公正举贤任能”的人力资源经营理念，未来，长飞人力资源将助力长飞公司砥砺前行、携手同行。

Learning and Sharing Help Achieving Win-Win Results

YOFC Group Human Resources Conference Was Held Successfully

◎ Strategy Center | Zeng Yunfei

“YOFC Group Human Resources Conference” sponsored by YOFC Human Resources Center was grandly held in Wuhan recently. YOFC Human Resources Center and over 30 heads of human resource from YOFC branches and subsidiaries at home and from abroad gathered together to share and communicate the human resources related work in this year and had a full discussion about the group human resource development and promotion around the theme of learning

and sharing help achieving double win results.

Zhuang Dan, executive director and president of YOFC, delivered a speech. He said that in the past year the headquarter human resources center and the human resources colleagues of branches and subsidiaries have made their own contributions to the development of YOFC Group and achieved remarkable results. The changes in the future market and industry require that strategic objectives

in the work implementation. Meanwhile, human resources should fully explore and give full play to the enthusiasm of each employee to facilitate the continuous development of YOFC.

YOFC human resources director Zhou Yijun delivered a speech for the conference. She said “learning and sharing help achieving double win results” is the theme of the conference and is also the common mission and goals of the company human resources center and subsidiaries. She described

that YOFC company human resource center’s organizational structure, performance management, human resources, budget, rank and position, the internal aspects of curriculum development, qualification, talent development project results and experience.

YOFC human resources group is committed to building a low-cost and high-quality human resources system. In 2019, the business environment of the development of the company is to reduce the cost and increase the efficiency of its main business, rapidly expand new business and enhance the platform capability of functional departments. YOFC Group human resources center YOFC Group human resources shall unify its thoughts, practice its internal strength, provide strong support for business

development, and then effectively improve the company’s human resources management level so as to provide guarantee for the company’s strategy, operation and management.

During the two-day YOFC Group human resources conference, the human resources center of YOFC company fully communicated and discussed with all branches and subsidiaries and sharing of training resources, etc. and many branches and subsidiaries shared their best practice cases. Finally, all the delegates to the meeting with the determination and momentum of decisive battle field, through perseverance sing Chinese men to actively meet the opportunities and challenges in the future.

At this moment of renewal global business environment, YOFC company human resources adapt to the external

environment changes through their own constantly, and it can be ready for the challenge. Over the past year, YOFC built strong human resources processes and tools to promote the development and management and the capability of the workforce, the growth of cohesive company strategy, culture and core competitiveness through constantly importing external advanced methodology and best practices and learn from the industry benchmarking and advanced enterprises and enables the human resources system to run effectively and thus constantly optimized, adhering to the fair as human resources management idea. In the future, YOFC human resources will help YOFC company forge ahead hand in hand.



图 | 中国国家博物馆内，参展观众正在观看长飞公司展示视频

编者按：11月，“伟大的变革——庆祝改革开放40周年大型展览”在中国国家博物馆开幕，展览以坚持和发展中国特色社会主义为主题，紧扣改革开放40年历程和改革开放的历史纵深感、群众获得感、发展成就感，安排设计了“伟大的变革、壮美篇章、关键抉择、历史巨变、大国气象、面向未来”等六个主题展区，多角度、全景式集中展示我国改革开放40年所取得的伟大成就。

长飞公司作为中国光通信行业的唯一代表，庄重地亮相了本次庆祝改革开放40周年大型展览，向全世界讲述了中国光通信行业从零起步，从小到大，从跟随到引领，从引进吸收到创新输出，实现从依赖进口国外技术设备到制备工艺和设备完全国产自主，并开始向国外反向输出设备的跨越式发展历程。

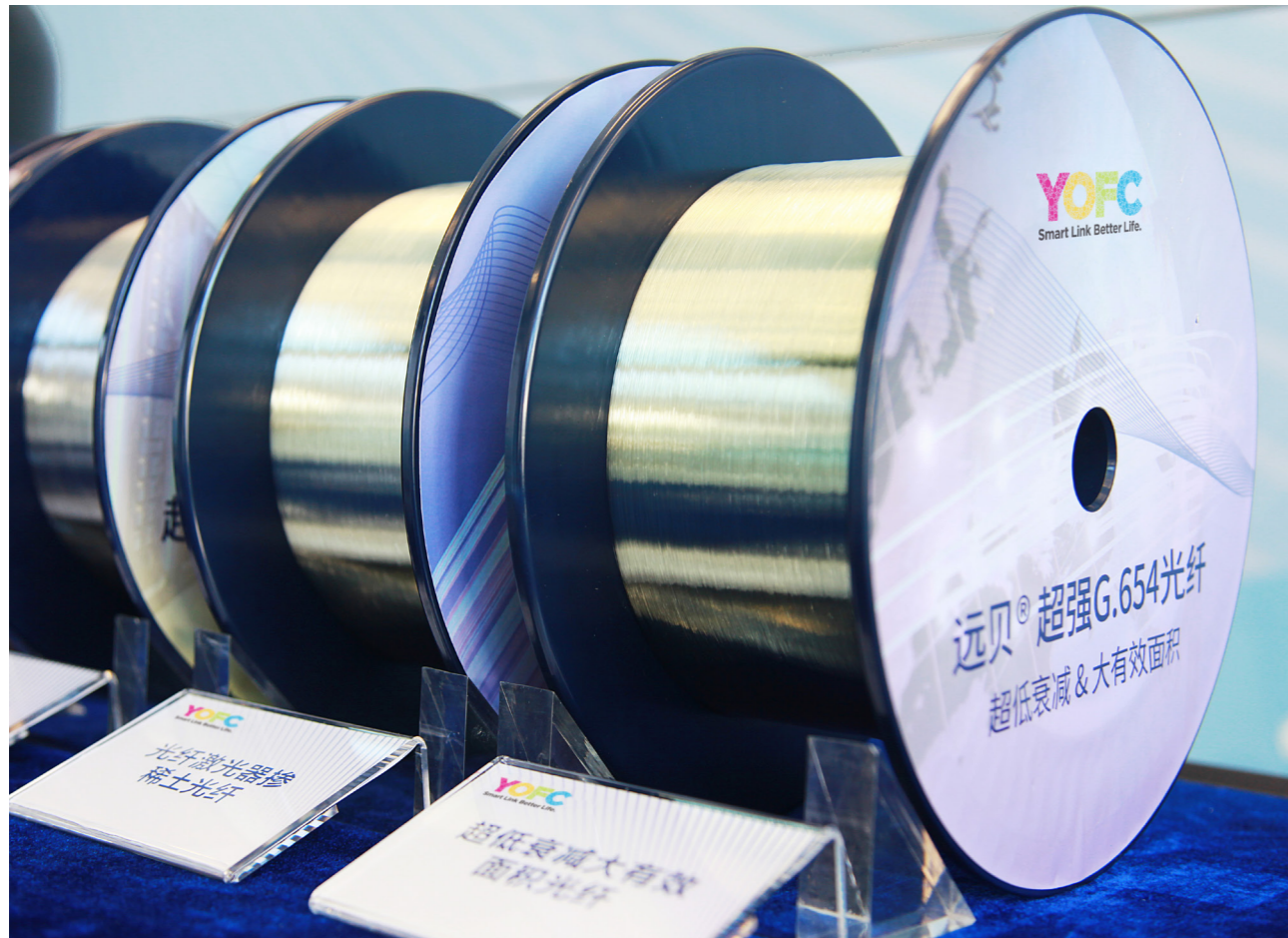
一根玻璃丝见证改革开放时代传奇

◎ 本刊编辑部

下班路上，滑滑手机，家里的空调、电饭锅就开始工作，打开家门，迎接我们的，是丝丝凉爽和米香弥散。这一切于您，只需动动手指，但背后却需要大量信息数据的传输和执行，而传输和执行的效率就取决于这根细如发丝的玻璃丝。今年，全球传输速度最快、传输容量最大的光纤，在长飞公司实现批量生产。

在这里，见证改革开放时代传奇：40年前，这里还是一片荒芜之地，而全国各地邮电局前每天等候打电话的长队一排就是上百米，为了安装一部固定电话，大家挤破头皮，由于通信障碍造成的经济损失甚至高达上千万，通信的桎梏引起国家的高度重视；30年前，长飞公司诞生，成功实现我国光纤的规模化生产，我国“八纵八横”重点工程中使用的光缆80%都是“长飞”光缆；20年前，长飞公司研发的多种光纤品种打破了长期为欧美日韩企业完全垄断的局面；2年前，长飞公司的光纤预制棒、光纤、光缆三大主营业务销量全面实现全球第一，成功实现中国光纤光缆企业的“逆袭”；今年，这家现代化高科技企业进入而立之年，开启新征程，创造新未来。





此种光纤的公司，2017年，长飞公司率先实现规模生产适用于下一代网络通信的超低衰减大有效面积G.654.E光纤，成为全球唯一能够生产此种光纤的中国公司，这些都标志着我国的光纤研发能力达到国际一流水平；2005年和2017年，长飞公司两次荣获国家科技进步二等奖，是光纤光缆行业获得国家科技进步奖级别最高、次数最多的；2015年以来，长飞公司成为国家工信部确定的首批46家智能制造试点示范企业之一，相继荣获“制造业单项冠军”和工业强基工程，是中国光纤光缆行业的唯一代表。

30年来，长飞公司坚持走改革开放、自主创新之路，让我们们在市场竞争中掌握主动权。30年前，长飞以市场换技术，现在用技术换市场，凭借着自己的技术走向海外设厂。

2013年7月，习近平总书记视察长飞时提出，“自己的碗里要装自己的粮食”，长飞也向总书记提出了“长飞梦”，如今五年过去，长飞公司全面掌握了行业核心技术、成为全球最大的光纤预制棒、光纤和光缆供应商，提前实现了“长飞梦”。

2018年4月，总书记再次视察湖北听取长飞公司汇报后，总书记提出科技攻关要摒弃幻想靠自己，核心技术关键技术、国之重器必须立足于自己。作为中国光纤光缆行业的龙头企业，长飞公司牢记习总书记嘱托，发挥模范带头作用，不仅要自己做得好，还要带动其他企业做好，进一步在过去已有的创新的基础上，通过坚持不懈的努力，推动整个行业实现从部分的引领走向全面的引领。

从港股到A股，长飞始终是行业在资本市场上第一个“吃螃蟹”的人



从荒地到热土，开放和创新成为长飞的血脉和基因

长飞公司因改革开放而生，因改革开放而兴，因改革开放而强。

1988年，承载着发展民族光纤产业的历史使命，原国家邮电部、武汉市人民政府和荷兰飞利浦公司合资成立长飞光纤光缆有限公司，即长飞光纤光缆股份有限公司前身，这是中国光纤光缆史上的第一家中外合资企业。

绵绵用力，久久为功。长飞公司“摸着石头过河”，克服了选址、基建、员工培训、设备调试等一系列挑战和困难，于1992年顺利投产。当时，京汉广、京津宁两条光缆通信一级干线都将采用长飞生产的光缆，这是我国第一次利用自己生产的光纤和光缆建设国家一级大动脉通信干线。长飞公司的成功运营，从根本上打破了外国公司对中国光纤光缆市场的

垄断，从根本上改变了中国依赖进口光纤光缆建设国家光缆通信干线的历史，为中国迈向“超高速信息公路”走出了辉煌的一步。

长飞公司坚持把创新作为企业发展主导战略之一，积极践行技术创新、产品创新、管理创新，创造了无数个行业的“第一”和“唯一”，为整个产业的发展增光添彩。

长飞公司是全球唯一同时拥有三大主流预制棒制备工艺PCVD、VAD和OVD的企业，具备自主生产光纤预制棒、光纤、光缆的生产设备的能力，并已经对外输出；拥有国内光纤光缆行业唯一的国家重点实验室“光纤光缆制备技术国家重点实验室”；1997年，长飞公司在国内率先成功开发了G.655单模光纤，成为全球继美国康宁、朗讯之后的第三家能生产

2014年12月，长飞在香港联交所主板成功上市，成为国内首家也是唯一一家在香港上市的专注于光纤预制棒、光纤和光缆等相关产品的企业。乘着改革开放的春风，靠着一股革命的勇气和劲头，2014年港股上市后，高速发展，营业收入年均增长28%，利润年均增长40%，上市三年后长飞公司的股价涨了400%，2017年全年收入达到103.7亿，5年实现翻番，良好的经营业绩实现了对股东好的回报和国有资产的持续增值。

长飞赴港上市，不仅对于企业自身发展具有里程碑意义，对行业发展也有带动、引领作用。长飞率先赴港上市后，给香港投资者“科普”国内光纤光缆行业及企业，带动国内多家光纤光缆企业赴港上市，一定程度上对拉动光纤光缆行业发展发挥了样本示范作用。

为进一步优化公司治理架构、推进公司整体战略布局，长飞公司向A股资本市场靠拢，于2018年7月20日在上海证券交易所挂牌成功上市，成为国内光纤光缆行业首家、湖北省首家在香港、上海两地上市的企业，实现双核资本运作，开启了跨越式发展的全新征程。

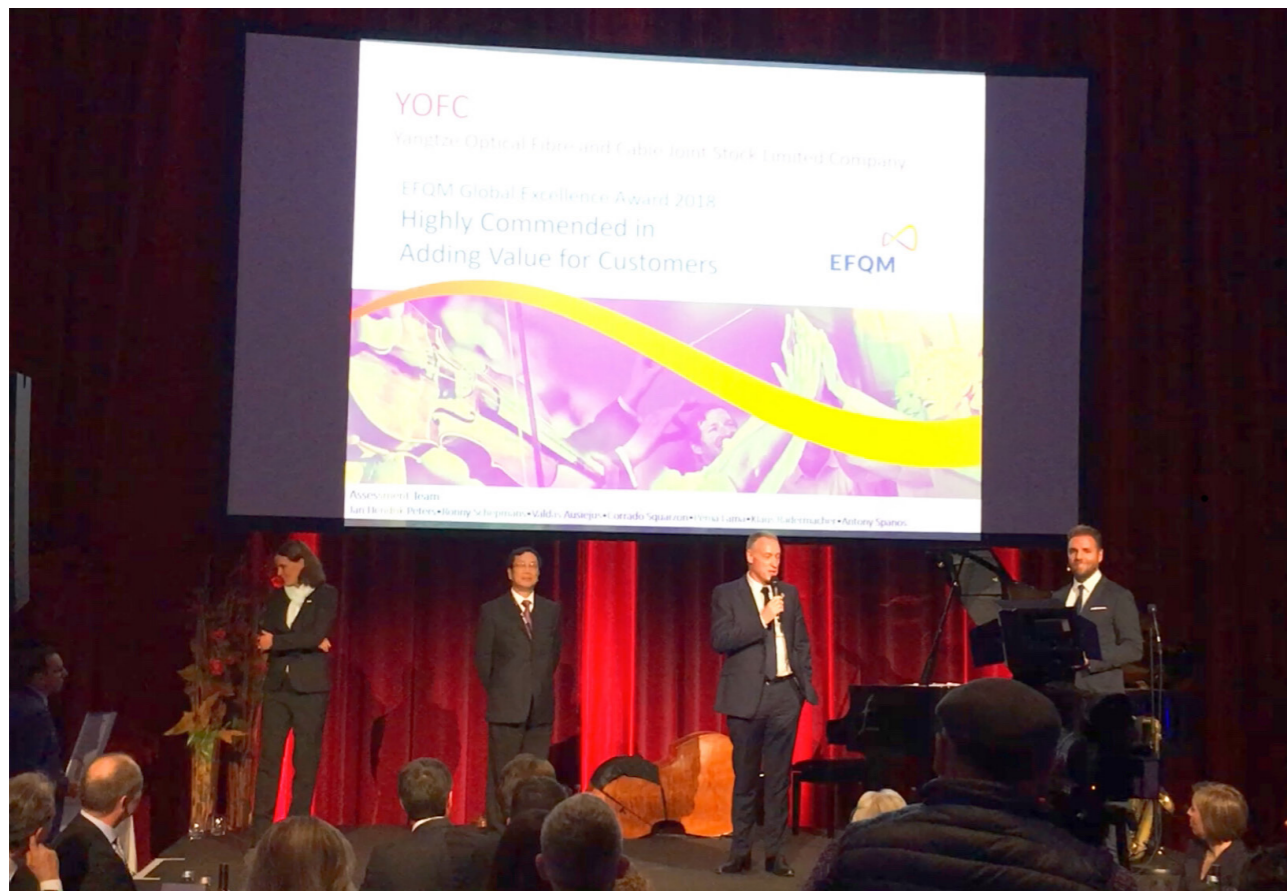
改革开放的40年，是国家充分利用国际国内两个市场、两种资源加快发展的40年，长飞公司抓住历史机遇，持续以自身的实力和示范作用，推动中国乃至全球光纤光缆行业的发展和强大。

“中国首家：长飞公司问鼎‘欧洲质量奖’”、“武汉长飞获‘欧洲质量奖’，系世界三大政府质量奖之一”、“光谷企业长飞光纤获欧洲质量奖为26年来首个中国企业”……10月19日的凌晨，长飞荣获世界三大政府质量奖之一——“欧洲质量奖”，成为该奖项设立26年以来第一家获奖的中国企业的消息，铺天盖地，好不热闹。这也是继2017年获第十七届全国质量奖后，摘取的又一质量大奖。

长飞公司作为一家合资公司，在引进现代化生产技术的同时，也引进了现代化的管理方法和制度，尤其是业界先进的质量管理程序，拥有与生俱来的质量基因；1993年，长飞公司通过ISO9002质量管理体系的认证，目前拥有八大管理体系，ISO9001质量管理体系、通信行业TL9000质量管理体系、ISO14001环境管理体系、OHSAS18001职业健康安全管理体系、SA8000社会责任管理体系、ISO27001信息安全管理体系、ISO17025实验室管理体系、两化融合管理体系，构建长飞系统化的综合管理，为产品质量、公司运营提供体系保障；2012年，长飞公司全面导入卓越绩效管理模式，构建了从关注产品与服务质量到关注企业经营质量的卓越绩效管理模式。多年的质量坚守，长飞公司质量颇受行业认可，已经在国内外荣获多个质量奖。

实践是检验真理的唯一标准，时间也是检验品质的唯一标准。今年是国家“九五”重点工程“兰州—西宁—拉萨”光缆干线开通运行20周年，前不久青海省通信管理局联合中国电信青海公司、人民邮电社和中国通信企业协会，组织了一次兰西拉光缆（青海段）运行情况专题调研活动，调研显示，长飞公司为这条信息天路提供的光缆依然运行稳定，质量可靠。

从优秀到卓越，强质量之路永无止境



从高速发展到高质量发展，“引进来 走出去”绘就开放新格局

近年来，长飞公司积极“引进来”，通过收购和新设近10家产业链上下游子公司，构建了完整覆盖关键原材料、光纤预制棒、光纤、光缆、综合布线、网络工程技术服务等在内的行业最长的产业链。

除此之外，长飞公司积极将CRU（英国商品研究所，一家全球光纤光缆行业权威的咨询机构）全球光纤光缆大会、亚太FTTH（Fibre to the Home，光纤到户委员会）年会等国际性行业交流平台引入中国，搭建全球行业交流的平台，推动中国产业走向全球。

长飞公司积极响应国家“一带一路”倡议，加快“走出去”步伐，先后在缅甸、印尼、南非开设4家海外工厂，都相继成为当地最有影响力的光纤光缆供应商，凭借强大的技术和管理实力，赢得了合资方的尊重和信赖。2018年3月，南非驻华大使多拉娜·姆西曼女士访问湖北时为长飞点赞，“长飞公司能根据南非的独特市场定制其经营业务，这正是南非所需要的；目前，长飞公司在南非开展的业务范围也越来越大，这充分说明了两国在光通信领域还有很大的合作潜力。”

为了更好地贴近海外客户需求，提升服务质量，长飞公司不断加大海外销售团队建设，目前已建成海外办事处25个。

同时，长飞公司还积极参与国际、国家和行业标准的制定、贯标与执行，输出中国智慧、中国方案，先后主持或参与起草各类标准166项，截至目前，有700多项国内外的专利，与国内同行相比，海外专利申请量、授权量，位居第一；光纤领域专利申请量、授权量，位居第一。

今年是改革开放40年，也是长飞成立30年。长飞30年的发展历程，恰好谙合改革开放40年的进程，有艰辛、有波折，但最终走向成功。站在新时代的历史起点，长飞将在坚持改革开放的光明道路上砥砺前行，争做行业高质量发展排头兵。

Editor's note: In November, a major exhibition commemorating the 40th anniversary of China's reform and opening-up opened at the National Museum of China. Themed "adhering to and developing socialism with Chinese characteristics", the exhibition showcases the journey of China since the reform and opening-up 40 years ago, and has several themed exhibition areas, including key choices, splendid chapters, historical changes, presence of a major country, and looking into the future. The exhibition displays the in-depth sense of history, the sense of attainment of the public, and the sense of achievement, comprehensively showing the magnificent achievement of China since the reform and opening-up from multiple aspects.

A legend in the time of reform and opening-up – witnessed by a string of glass fibre

● The Editorial

On the way back home, people can operate their air-conditioners and rice cookers at home with their phones; when they back home, they are greeted by the cool air and the pleasant smell of rice. For you, all that required is no more than simply using your phones. But what is not known to most people is that the convenience of life is made possible by transmission and implementation of enormous amount of data, and that the efficiency of the transmission and implementation depends on this glass fibre. This year, YOFC has managed to produce the optical fibres with the highest speed and the largest transmission capacity in bulk.

YOFC is an epitome of the legend of reform and opening-up. Forty years ago, it was a barren land here. Across the country, people who needed to make phone calls had to wait in queues in front of post and telecommunication offices, and the queues could be longer than 100 meters. People competed to install a landline telephone, and the

financial loss caused by barriers in telecommunication even mounted to more than ten million. Thirty years ago, YOFC was established and managed to produce optical fibres on a large scale. In the Eight Vertical and Eight Horizontal high-speed railway network key project, 80% of the optical fibres were produced by YOFC. Twenty years ago, in the optical fibre industry, YOFC produced multiple kinds of optical fibres through independent R&D, which ended the absolute monopoly by the companies based in Europe, the US, Japan and South Korea, and this monopoly had lasted for a long time. Two years ago, the sales volume of the major three business of YOFC (preform, optical fibre and cable) reached world No. 1, marking the optical fibre industry in China catches up as a latecomer. This year marks its 40th anniversary of its establishment, and YOFC will seize the opportunity to embark on a new journey, to pursue a brighter future.

From barren land to land of hope, openness and innovation become the essence and spirit of YOFC

YOFC was established by taking the opportunity of reform and opening-up. Thanks to this golden opportunity, YOFC thrived and grew strong.

In 1988, the former Yangtze Optical Fibre and Cable Co., Ltd, which is now the Yangtze Optical Fibre and Cable Joint Stock Limited Company (YOFC), was established as a joint venture with efforts from the former Ministry of Post and Telecommunications of the PRC, the People's Government of Wuhan and Royal Dutch Philips Electronics Ltd..

As the first sino-foreign equity joint venture in the optical fibre and cable industry, and also the first sino-foreign equity joint venture in Wuhan, it has undertaken the historical mission of vitalizing the development of the optical fibre industry of China.

YOFC has been gathering strength to seek sustainable prosperity. It moved forward carefully through trials, and has overcome a series of challenges and obstacles including choosing the site, infrastructure construction, staff training, and equipment debugging, and managed to launch production in 1992. At that time, both the Beijing-Wuhan-Guangzhou level 1 artery fibre communication line and the Beijing-Tianjin-Nanjing level 1 artery fibre communication line used the optical fibres produced by YOFC, marking China started using the optical fibre and cable made in China for constructing national level-1 artery communication lines. The success of YOFC means the monopoly in China by foreign companies in this industry ended, and has fundamentally ended China's dependence on imported optical fibres and optical cables for artery fibre communication lines. For China, it is a significant step towards building the "information superhighway" of our own.

For YOFC, innovation has been one of the guiding strategies, and has made YOFC the "first one" and the "only

one" in the industry in multiple aspects, thanks to its pursuit of innovation in technology, product and management. It was innovation that made YOFC become a remarkable contributor in the industry.

YOFC is the first company in the world that masters the techniques of producing the three major preforms (PCVD, VAD and OVD). It is also capable of producing manufacturing equipment of optical fibre preform, optical fibre and cable independently, and has been exporting such equipment. The YOFC State Key Laboratory of Optical Fibre and Cable Manufacturing Technology is the only national key laboratory of the industry. In 1997, YOFC succeeded in developing G.655 single-mode fibre, becoming the third company in the world that can produce G.655 fibre, after Corning Inc. and Lucent Technologies, both from the US. In 2017, YOFC managed to put G.654.E fibre, a kind of fibre adaptive to next-generation network and telecommunication with novel ultra-low attenuation and large effective area, into mass production, becoming the first Chinese company capable of producing G.654.E fibre. All these achievements mark that China's capabilities in fibre R&D rank top in the world. In 2005 and 2017, YOFC won the Second Class National Science and Technology Progress Award for twice, which has been the highest achievement of the industry in National Science and Technology Progress Award, in terms of award level and the times of being awarded. Since 2015, YOFC has been one of the 46 intelligent manufacturing pilot demonstration enterprises of the first batch, according to the Ministry of Industry and Information Technology of the PRC. As the only "Champion in Manufacturing" and the only company listed among the "industry transformation and upgrading" project in the industry, YOFC represents the leading-edge of the optical fibre and cable industry of China.

Over the past three decades, in the spirit of reform and opening-up, as well as independent innovation, YOFC has taken initiative in the market competition. Thirty years ago, we opened the market to foreign enterprises to gain techniques, and now we can win the market with our own techniques. Now, YOFC has established companies abroad with its own technologies.

In July 2013, when General Secretary Xi inspected YOFC, he noted that, "We need food produced by ourselves on our table", and also learned about the "dream of YOFC". Five years later, YOFC has mastered the core technologies in the industry, and has become the largest manufacturer of preform, optical fibre and cable, realizing the "dream of YOFC" earlier than expected.

In April 2018, when General Secretary Xi inspected in Hubei, he took note of YOFC's report and pointed out that do not insist on being independent blindly when working on National Key Technologies R&D Programs, whereas we must remain independent in core technologies, key technologies and the pillars of our nation. As the leading enterprise in the industry, YOFC bears the words from General Secretary in mind, and plays a leading role. Driving other companies in the industry to thrive is its goal, instead of the success of YOFC itself only. Based on the innovations it has already made, YOFC will promote the optical fibre industry of China, and make it be the leader in the industry in every aspect through our unremitting efforts.

From HK stocks to A shares, YOFC has been the pioneer of the industry in capital market

In December 2014, YOFC, which specializes in producing preform fibre, cable and other related products, was listed on the Main Board of HKEX (Hong Kong Stock Exchange), becoming the first and the only Chinese company of the industry listed on HKEX. Taking the opportunity of reform and opening-up, and with the courage and spirit of making a difference, YOFC has developed rapidly since it was listed in Hong Kong in 2014. Its revenue increases by 28% each year by average, and profits grow by 40% each year by average. After being listed on HKEX for three years, the stock price of YOFC has increased 400%. The turnover in 2017 reached RMB 10.37 billion, marking a 100% increase in five

years. YOFC repays the shareholders with amazing performance, and ensures a steady increase of state-owned property.

Being listed on HKEX is not only a milestone for YOFC itself, but also promotes the development of the industry. After listing in Hong Kong, investors in Hong Kong started to know the fibre industry and fibre enterprises of Chinese mainland better, and more fibre enterprises from the mainland were listed on HKEX after that. In this regard, the fibre industry of Chinese mainland has been promoted with YOFC's demonstration effect.

To further improve its governance structure and advance the general strategic layout, YOFC decided to join

the A-shares market and was listed on the SSE on July 20, 2018, becoming the first fibre company of China and the first company of Hubei listed both on HKEX and SSE. Now, YOFC is operating with capitals from both stock exchanges, therefore starting a new journey of leapfrog development.

In the past four decades of reform and opening-up, China fully utilized the markets and resources from both home and abroad, to speed up development. YOFC has taken this historic opportunity, driving the industry of optical fibre and cable, in China and even in the world, to develop and to be strong, with its own strength and demonstration effect.

From excellent to outstanding, the endless pursuit for high quality

"YOFC won 'European Quality Award' as the first Chinese company", "Wuhan-based YOFC won 'European Quality Award', one of the three EFQM Excellence Awards in the world", "YOFC from Optics Valley in Wuhan became the first Chinese company won the European Quality Award for the past 26 years" ... In the morning of October 19, YOFC won the European Quality Award (EQA), one of the three EFQM Excellence Awards in the world, becoming the first Chinese company to win the Award for the past 26 years since EQA was established. The news was wildly covered by media. This is another award that YOFC has won since it received the China Quality Award in 2017.

As a joint venture, YOFC introduces not only modernized manufacturing technologies, but also modernized approaches and mechanisms for management, especially the industry-leading quality management processes, which endows YOFC with

the pursuit for high quality. In 1993, YOFC received ISO 9002 Certification, and has now been certified by eight major quality management systems, including ISO 9001, TL 9000 for the global ICT industry, ISO 14001 for environment management, OHSAS 18001 for occupational health and safety management, SA 8000 for the social accountability of an organization, ISO 27001 for information security, ISO 17025 for general requirements for laboratories, and the management system for integration of informatization and industrialization, to achieve systematic and comprehensive management in YOFC, so as to ensure product quality and the successful operation of YOFC. In 2012, YOFC fully introduced the Performance Excellence Model, and has therefore established its model that focuses on the quality of products and services, and the quality of operation. All these years, YOFC's emphasis on high quality has been rewarded with recognition in the

industry. Over the years, YOFC has won several quality awards of China and abroad.

Practice is the sole criterion for testing truth, whereas time is the sole criterion for testing quality. 2018 marks the 20th anniversary of operating the trunk line of fibre optical cable that connects Lanzhou – Xining – Lhasa, which is a key project during the "9th Five-year Plan". Recently, a special research on the operation of Lanzhou – Xining – Lhasa fibre optic cable (the section in Qinghai) was carried out by Qinghai Communication Administration, with joint efforts from the Qinghai Branch of China Telecom, People's Posts and Telecommunications News and China Association of Communication Enterprises. The research showed that the hi-tech-supported information route enabled by YOFC was still in smooth operation, all thanks to its high quality.

From rapid development to high-quality development, form a new landscape of "bringing in" and "going global"

In recent years, YOFC has proactively implemented the "bringing in" strategy, and has purchased or established almost ten subsidiaries for the upstream and the downstream of the industry chain, therefore forming a complete industry chain that covers key source materials, optical fibre preforms, optical fibres, optical cables, cabling systems, technical services for network engineering and other related areas. This is the longest industry chain in the industry.

In addition, YOFC has also proactively introduced many international communication platforms of the industry into China, including the CRU World Optical Fibre & Cable (CRU: Commodity Research Unit, a UK-based authoritative consulting organization of the fibre and cable industry) and FTTH Council Asia-Pacific (FTTH: Fibre to the Home), helping build the communication platform of the industry for the whole world, and helping the fibre and cable industry of China go global.

In its active respond to the Belt and Road Initiative and stepping up

the pace of "going global", YOFC has established four factories in Burma, Indonesia and South Africa. All the four factories have become the most influential local manufacturers of fibre and cable, and have won the respect and trust from joint venture partners with their own strength in technology and management. In March 2018, Ms Dolana Msimang, ambassador of South Africa to China, spoke highly of YOFC when she visited Hubei. She noted that, "YOFC designs its business in South Africa based on the unique local features, and this is what South Africa needs. Currently, the scope of business of YOFC in South Africa keeps expanding, which perfectly demonstrates that the cooperation between China and South Africa is of great potential."

To better meet the requirements from overseas customers and improve service quality, YOFC has made great efforts in building the overseas sales team. Now, YOFC has 25 overseas offices.

At the same time, YOFC has taken an active role in formulating and

implementing national and international standards of the industry, contributing the wisdom of China to the world. YOFC has presided over or participated in the draft of 166 standards, and is the holder of more than 700 intellectual property rights of China and of other countries. Compared with its Chinese counterparts, YOFC ranks top by the number of overseas IPRs it has applied for and has been granted, and by the number of IPRs it has applied for and has been granted in the optical fibre industry.

This year marks the 40th anniversary of reform and opening-up of China, and also the 30th anniversary of YOFC's establishment. Just like China's reform and opening-up, YOFC has also undergone hardships and setbacks, but succeeded in the end. At the starting point of a new era, YOFC will forge ahead by taking the opportunities of reform and opening-up, and be the champion of high quality in the industry.

长飞成功助力建设世界“四最”特高压直流输电工程

◎ 特产事业部 | 毕伟

近日, 昌吉-古泉 ±1100kV 特高压直流输电工程顺利完成了双极低端直流系统调试, 首次将疆电直接输送到华东电网。长飞公司为该工程提供从换流阀到阀基控制设备之间的通信链路, 经过 2 个月的链路物资准备、连续 40 天的光缆现场铺设和测试, 配合南瑞继保完成了工程的双极低端直流系统调试。

昌吉-古泉 ±1100kV 特高压直流输电工程是世界上电压等级最高、输送

容量最大、输电距离最远、技术水平最先进的特高压直流输电工程, 是特高压输电领域持续创新的重要里程碑。工程起于新疆昌吉换流站, 止于安徽古泉换流站, 途经新疆、甘肃、宁夏、陕西、河南、安徽 6 省区, 线路全程约 3319 公里。该项目交期急, 实验要求苛刻, 施工难度大, 尤其是高空作业, 路由长, 落差大, 以往 800 千伏高压, 此次工程项目是 1100 千伏高压, 施工现场铁塔高度增加

了 30%, 导致了光缆拉力落差大, 这就需要 800 千伏原有的光缆基础上增加至少 20%。同时, 转弯多, 穿墙多, 严重考验光缆的弯曲半径。项目组成员发挥兰西拉光缆精神, 与客户协同, 成功完成交付, 为客户创造价值。

近年来, 我国在电力电网设备及技术的国产化与自主创新方面不断取得突破, 主要得益于关键原材料、工业控制技术、光纤传感技术等技术的突破, 这些技术的一个重要方向便是特种光纤、特种光纤工控和组网技术以及基于特种光纤的分布式传感技术。长飞公司基于 PCVD 核心技术, 开发大芯径大数值孔径、高带宽和优异弯曲性能的阀用触发光纤, 提高了特高压输电换流阀中触发信号的传输稳定性。同时, 长飞技术团队为该光纤配套了高耐压、高绝缘、低损耗、耐湿热和抗老化的光缆护套材料, 通过对光缆组件的结构优化、胶水灌封, 解决了在潮湿地带光缆局部放电水平高的问题, 具备优异的防水防潮性能。在多年的工程案例中, 长飞公司已成功为我国 20 多个电力电网工程提供专业的产品及技术服务。



YOFC Contributes to Construction of UHVDC Project

◎ Specialty Fibre Division of YOFC | Bi Wei

Recently, Changji-Guquan ±1100kV UHVDC project has successfully completed the debugging of bipolar low-end DC system and transmitted power directly from Xinjiang to East China power grid for the first time. YOFC provides the communication link between converter valve and valve base control equipment for the Project. After 2 months of link supply preparation and 40 consecutive days of on-site optical cables laying and testing, YOFC has completed the debugging of the Project's bipolar low-end DC system in cooperation with NR Electric.

By leveraging the most state-of-the-art technology, Changji-Guquan ±1100kV UHVDC project, with the highest voltage class, the largest transmission capacity, and the longest transmission distance worldwide, hits an important milestone in the UHV transmission field to seek innovations. Spanning about 3,319km, the project starts from Xinjiang Changji Converter Station and ends at Anhui Guquan Converter Station, passing through six provinces including Xinjiang, Gansu,

Ningxia, Shaanxi, Henan and Anhui. Due to short construction period and high experimental requirements, the project is of great difficult in construction, especially in high-altitude operations with long route and high topographic relief. As the project is 1100kV high-voltage, the valve tower height on the construction site increases by 30% than that of previous 800kV high voltage, causing big cable tension variation, which requires at least an another 20% increase over original 800kV cable. In addition, more turns and through-wall laying pose great challenges to the bending radius of optical cables. Project team members, following the spirit of hard work in building Lanzhou-Xining-Lhasa Optical Fiber Cable, coordinate with clients to successfully complete the task and create values for clients.

In recent years, China's breakthroughs in such technologies as key raw materials, industrial control technology and optical fibre sensing technology have contributed to the breakthrough in localization and independent innovation of power and

grid equipment and technology. One of the important development directions of these technologies is specialty fibre, specialty fibre industrial control and networking technology, and specialty fibre-based distributed sensing technology. Based on PCVD core technology, YOFC develops the trigger fibre for valve with large core, high NA, high bandwidth and excellent bending performance, which has improved the transmission reliability of trigger signal in UHV transmission converter valve. Meanwhile, YOFC's technical team provides sheath materials for such trigger fibre, featuring high pressure resistance, high insulation, low loss, humidity resistance, ageing resistance and excellent waterproof and moisture-proof performance, and has solved the problem of partial discharge in wet zones through structure optimization and pouring sealant of cable assembly. Over the years, YOFC has successfully provided professional products and technical services for more than 20 power grid projects in China.

浅述多模光纤的演进之路

◎ 多模产品线 | 孙梦珣

前言: 通信光纤根据其应用波长下传输模式数量的不同, 分为单模光纤和多模光纤。尽管市场需求量不及单模光纤, 但由于多模光纤芯径较大, 可以配合廉价的光源使用, 因此在短距离传输场景下有着极为广泛的应用, 如数据中心、局域网等。近年来, 随着数据中心建设的高速发展, 作为数据中心和局域网应用主流的多模光纤也迎来了春天, 引起了人们的关注。今天, 我们就来聊一聊, 多模光纤的发展历程。

按照标准 ISO/IEC 11801 规范, 多模光纤分为 OM1、OM2、OM3、OM4、OM5 五个大类, 其与 IEC 60792-2-10 的对应关系, 如表 1 所示。其中 OM1, OM2 是指传统的 62.5/125m 和 50/125m 多模光纤; OM3、OM4 和 OM5 是指新型的 50/125m 万兆位多模光纤。

表 1 标准对应关系

ISO/IEC 11801 Types	OM1		OM2		OM3	OM4	OM5
Core diameter	50	62.5	50	62.5	50	50	50
IEC 60793-2-10 type correspondence	A1a.1	A1b	A1a.1	A1b	A1a.2	A1a.3	A1a.4

一、传统多模光纤

多模光纤的研发始于上个世纪七八十年代, 早期的多模光纤包括很多尺寸种类, 列入国际电工委 (IEC) 标准中的尺寸类型包括四种, 芯包层直径分为 50/125 μ m、62.5/125 μ m、85/125 μ m 和 100/140 μ m。由于芯包层尺寸大则制作成本高、抗弯性能差, 而且传输模数量增多, 带宽降低, 因而较大芯包层尺寸的类型逐渐被淘汰, 逐渐形成了两种主要的芯包层尺寸, 分别是 50/125 μ m 和 62.5/125 μ m。

在早期的局域网中, 为了尽可能地

降低局域网的系统成本, 普遍采用价格低廉的 LED 作光源。由于 LED 输出功率低, 发散角比较大, 而 50/125m 多模光纤的芯径和数值孔径都较小, 不利于与 LED 的高效耦合, 不如芯径和数值孔径大的 62.5/125m 多模光纤能使较多的光功率耦合到光纤链路中去, 因此, 50/125m 多模光纤在 20 世纪 90 年代中期以前不如 62.5/125m 多模光纤那样得到广泛的应用。

随着局域网传输速率不断升级, 自 20 世纪末以来, 局域网向 1Gb/s 速率以上发展, 以 LED 作光源的 62.5/125 μ m

多模光纤仅仅几百兆的带宽逐渐不能满足要求。相比之下, 50/125m 多模光纤数值孔径和芯径较小, 传导模式也较少, 因而有效地降低了多模光纤的模式色散, 使得带宽得到了显著的增加, 由于芯径较小, 50/125m 多模光纤的制作成本也更低, 因此重新得到了广泛的应用。

IEEE802.3z 千兆位以太网标准中规定 50/125m 多模和 62.5/125m 多模光纤都可以作为千兆位以太网的传输介质使用。但对新建网络, 一般首选 50/125m 多模光纤。

二、激光优化的多模光纤

随着技术的发展,850nm VCSEL(垂直腔体表面发射激光器)出现。VCSEL激光器比长波长激光器价格更低,同时能够提高网络速率,因此获得了广泛应用。由于两种发光器件的不同,必须对光纤本身进行改造,以适应光源的变化。

为了VCSEL激光器需要,国际标准化组织/国际电工委员会(ISO/IEC)和美国电信工业联盟(TIA)联合起草了新一代纤芯为50μm的多模光纤的标准。ISO/IEC在其所制定的新的多模光纤等级中将新一代多模光纤划为OM3类别(IEC标准为A1a.2),即为激

光优化的多模光纤。

后续出现的OM4光纤,实际是OM3多模光纤的升级版。OM4标准与OM3光纤相比,只是在光纤带宽指标做了提升。即OM4光纤标准在850nm波长的有效模式带宽(EMB)和满注入带宽(OFL)相比OM3光纤都做了提高。如下表2所示。

表2 OM3和OM4光纤对比

光纤类型 Fibre type	满注入带宽 (MHz·km) Full injection bandwidth	有效模式带宽 (MHz·km) Effective mode bandwidth
	850nm	850nm
OM3	≥1500	≥2000
OM4	≥3500	≥4700

多模光纤内传输模式众多,随之还带来光纤抗弯曲性能的问题,当光纤弯曲时,高阶的模式极易泄露出去,造成信号的损失,即光纤的弯曲损耗。随着室内应用场景不断增多,多模光纤在狭窄环境下的布线,对其抗弯曲性能也提出了更高要求。

不同于单模光纤简单的折射率剖面结构,多模光纤的折射率剖面十分复杂,需要极为精细的折射率剖面设计与制作工艺。在目前国际主流的四大预制棒制备工艺中,制备多模光纤最为精密的是等离子体化学气相沉积(PCVD)工艺,以长飞公司为代表。该工艺不同于其他工

艺,其沉积层数多达几千层,且沉积时每层仅约1微米的厚度,能够实现超精细的折射率曲线控制,从而实现高带宽。

通过对多模光纤折射率剖面的优化,现在的弯曲不敏感多模光纤,其抗弯性能有了显著提升,如下图1所示。

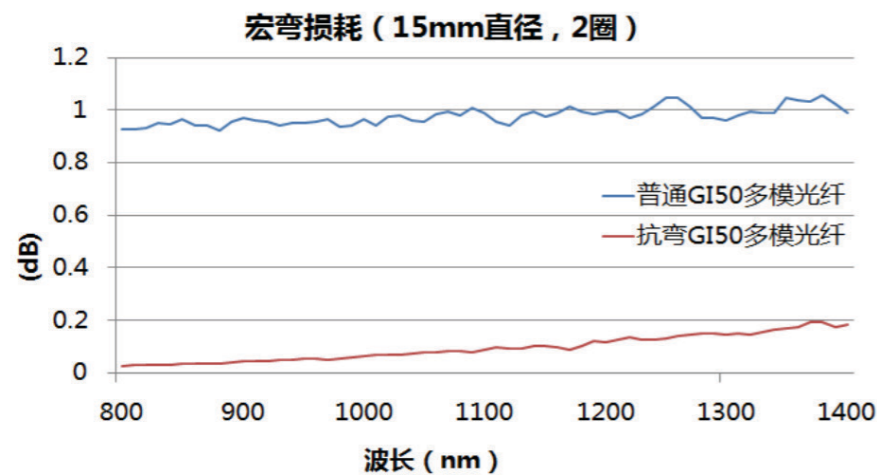


图1 抗弯多模光纤与常规多模光纤宏弯性能比较

三、新型多模光纤(OM5)

OM3光纤和OM4光纤,都是主要应用于850nm波段的多模光纤。随着传输速率的不断提升,仅仅单通道的波段设计,会带来越来越密集的布线成本,随之的管理维护成本也相应升高。因此,技术人员尝试将波分复用概念引入多模传输系统中,如果能够在同一根光纤上传

输多个波长,则相应的并行光纤根数和铺设、维护成本都能大幅下降。在此背景下,OM5光纤应运而生。

OM5多模光纤,是在OM4光纤基础上,拓宽了高带宽通道,其能够支持850nm~950nm波段的传输应用。目前主流的应用,是SWDM4和SR4.2设计。SWDM4是4个短波的波分复用,分别是

850nm、880nm、910nm和940nm。这样在一根光纤可以支撑此前4根并行光纤的业务。SR4.2是两波分复用,主要用于单纤双向技术。OM5能够与性能好成本低的VCSEL激光器配合,以更好的满足数据中心等短距离通信。下表3是OM4和OM5光纤的主要带宽指标对比。

表3 OM4和OM5光纤带宽指标对比

光纤类型 Fibre type	满注入带宽 (MHz·km) Full injection bandwidth		有效模式带宽 (MHz·km) Effective mode bandwidth	
	850nm	953nm	850nm	953nm
OM4	≥3500	无要求	≥4700	无要求
OM5	≥3500	≥1850	≥4700	≥2470

目前,OM5光纤作为一种最新型的高端多模光纤,已有了许多应用案例。其中最大的一个商业案例,是长飞公司和中国铁路总公司主数据中心的OM5商用案例。该数据中心瞄准了OM5光纤在SR4.2上的波分系统应用优势,使用最低的成本,实现了最大容量的通信,也为未来进一步升级速率做了准备,未来

提升速率至100Gb/s乃至400Gb/s,或者扩宽波段应用时,可以不再更换光纤,能够显著降低未来升级成本。

总结:随着应用的需求不断提高,多模光纤在朝着低弯曲损耗,高带宽,多波长复用的方向发展,其中,最具有应用潜力的,当属OM5光纤,其具有目前多模光纤最优的性能,为未来100Gb/s

和400Gb/s的多波长系统提供了有力的光纤解决方案。此外,为适应高速率,高带宽,低成本的数据中心通信的要求,新型的多模光纤,如单多模通用光纤,也正在研发中。未来,更多的新型多模光纤解决方案,将给数据中心和光纤互联,带来新的突破和更低的成本

The Evolution of Multimode Fibre is Briefly Described

● Multimode Fibre Product Line | Sun Mengxun

The communication fibres can be divided into single mode fibre and multi-mode fibres according to the number of transmission modes under its applied wavelength. Although the market demand is less than single mode fibres, the multi-mode fibre core diameter is large, it can be used with cheap light source. In the short distance transmission scenario, it has

a very wide range of application, such as data center, LAN. In recent years, with the rapid development of data center construction, multi-mode fibres as the mainstream of data center and LAN application has ushered in the spring and attracted people's attention. Today, we are going to talk about the development of multimode fibre.

According to the standards ISO/IEC

11801 specification, multi-mode optical fibre is divided into five categories: OM1, OM2, OM3, OM4 and OM5, and its corresponding relationship with IEC 60792-2-10 is shown in table1. OM1 and OM2 refer to the traditional 62.5/125um and 50/125um multimode optical fibre. OM3, OM4 and OM5 refer to the new 50/125um multimode fibres.

Table 1 Standard Correspondence

ISO/IEC 11801 Types	OM1		OM2		OM3	OM4	OM5
Core diameter	50	62.5	50	62.5	50	50	50
IEC 60793-2-10 type correspondence	A1a.1	A1b	A1a.1	A1b	A1a.2	A1a.3	A1a.4

1.Traditional multi-mode
In the 1970s and 1980s, the early multi-mode optical fibres included many types of sizes. The size types listed in the IEC standard included four types. The core cladding diameter was divided into 50/125um, 62.5/125um, 85/125um and 100/140um

because the core cladding size is large, the production cost is high, the anti-bending performance is poor, and the number of transmission modes is increased, with the bandwidth of reducing, the type of larger core cladding size is gradually washed out, and two main core cladding sizes

are gradually formed, respectively, 50/125um and 62.5/125um.
In the early days of the local area network (LAN), in order to reduce the system cost as much as possible, the low price of LED as light source is popularized adopted. LED output power is low and divergence angle is bigger

while 50/125 um multimode optical fibre core diameter and numerical aperture are relatively small. It is not conducive to efficient coupling with LED. The core diameter and the large numerical aperture 62.5/125um fibre can make more light sources coupling to the optical fibre link, therefore, 50/125um multimode fibre are less widely used than 62.5/125um multimode optical before the mid-1990s.

With the continuous upgrading of LAN transmission rates since the end of the 20th century, LAN has developed to a rate above 1Gbs. Especially, 62.5/125um multimode fibres with the LED light source was unable to meet the requirements. In contrast, the 50/125um multimode fibre has a smaller numerical aperture and core diameter and less conduction mode. Therefore, the mode dispersion of multimode fibre is effectively reduced, resulting in a significant increase in bandwidth.

Due to the smaller core diameter, the production cost of 50/125um multimode fibre is also lower, so it has been widely used again.

IEEE802.3z gigabit Ethernet standard specifies that both 50/125um multimode and 62.5/125um multimode optical fibres can be used as transmission media for gigabit Ethernet. But for new networks, 50/125um multimode fibres are generally preferred.

1.Laser optimized multimode fibres.

With the development of technology, 850ma VCSEL (vertical cavity

surface-emitting laser) emerged. VCSEL laser is widely used because it is cheaper than long wavelength laser and can improve network speed. Because of the difference between the two light emitting device, the optical fibre itself must be modified to adapt to

the intersection of light sources.

For VCSEL laser requirements, the international electro technical committee (ISO/IEC) of the international organization for standardization (ISO/IEC) and the United States telecommunications industry association (TIA) jointly drafted the standard for a new generation of multimode fibre with 50um fibre core. ISO/IEC classifies the new generation of multimode fibre into OM3 category (TEC standard is Ala.2).

The subsequent OM4 fibre is actually the upgraded version of OM3 multi-mode fibre. Compared with OM3 fibre, OM4 standard has only been improved in fibre widband index, that is, OM4 fibre standard has been improved in effective mode bandwidth (EMB) of 850nm wavelength and full-injection tier-width (OFL) compared with OM3 fibre. As shown in table 2 below.

Table 2 OM3 and OM4 fibre comparison

光纤类型 Fibre type	满注入带宽 (MHz·km) Full injection bandwidth	有效模式带宽 (MHz·km) Effective mode bandwidth
	850nm	850nm
OM3	≥1500	≥2000
OM4	≥3500	≥4700

There are many multimode optical fibre transmission modes. Then fibre anti-bending performance problems emerge. When optical fibre bends, the high order mode can easily leak, resulting in loss of signals, namely the fibre bending loss. With increasing indoor scenarios, multimode optical fibre under the environment of narrow wiring arrangement, also put forward higher requirements on the anti-bending property.

Different from the simple refractive

index profile structure of single mode fibre, the refractive index profile of multimode fibre is very complex and requires very fine refractive index profile design and production technology. At present, among the four major preform production processes in the international mainstream, the most sophisticated one for preparing multimode fibre is the plasma chemical meteorology deposition (PCVD) process, represented by YOFC.

This process is different from other

processes, its sedimentary layer is up to thousands of layers and the deposition of each layer is only about 1 micron thick and can achieve ultra-fine refractive index curve control so as to achieve high market.

Through the optimization of the refractive index profile of multimode fibres, the flexural performance of the current flexural insensitive multimode fibre has been significantly improved as shown in figure 1 below.

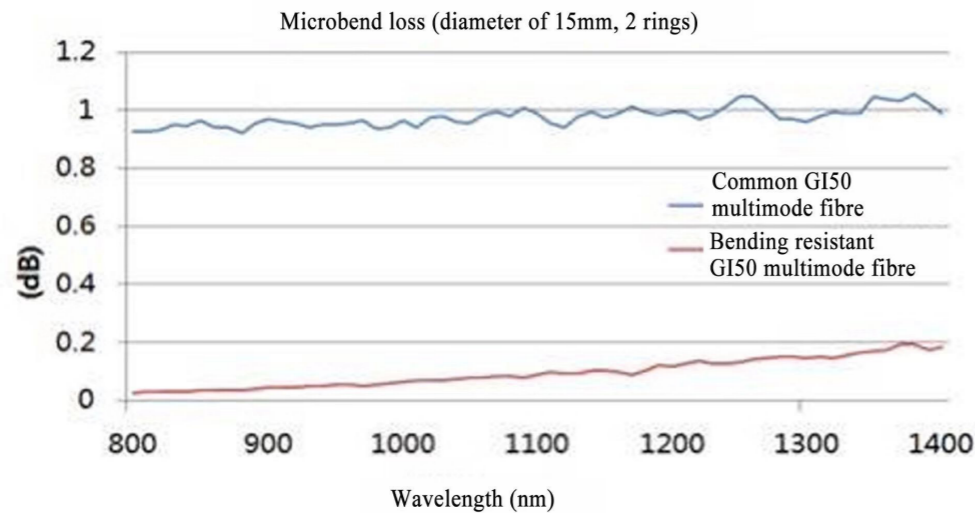


Figure 1 comparison of macro bending performance between anti-bending and conventional multimode fibres

3. New multimode fibres (OM5)

OM3 fibres and OM4 fibres are mainly used in 850nm band of multimode fibres. With the continuous improvement of transmission rates, only the band design of a single channel will bring more and more intensive

wiring costs and then the management and maintenance costs will rise accordingly. Therefore, technicians try to introduce the concept of wavelength division multiplexing into the multimode transmission system. If multiple wavelengths can be transmitted on a

single fibre, the corresponding number of fibre, laying and maintenance costs can be greatly reduced. In this context, OM5 optical fibre came into being.

OM5 multimode fibre is based on OM4 fibre, which expands the high bandwidth channel and can support the

transmission application of 850nm to 950nm band. The current mainstream applications are SWDM4 and SR4.2 designs. SWDM4 is the wavelength division multiplexing of four short waves, which are 850nm, 880nm, 910nm and 940nm respectively. In this way, one optical fibre can support the previous four parallel optical fibre services. SR4.2 is a two-wave division multiplexing, mainly used for single fibre bidirectional technology. OM5 can

cooperate with VCSEL laser with good performance and low cost to better meet short distance communication such as data center. The following table 3 compares the main bandwidth indexes of OM4 and OM5 fibre.

At present, OM5 fibre, as one of the latest high-end multimode fibre, has been used in many cases. One of the largest commercial cases is the OM5 commercial case of the main data center of YOFC and China Railway

Corporation. The data center targeting OM5 fibre wavelength division system application advantage on SR4.2 to realize the maximum capacity of communication with the lowest cost and also escalating rate is prepared for the future. The future rate of increase to 100Gb/s and even 400Gb/s, or widen the band application, can no longer change the fibre, can significantly reduce the upgrade costs in the future.

Fibre type	(MHz·km) Full injection bandwidth		(MHz·km) Effective mode bandwidth	
	850nm	953nm	850nm	953nm
OM4	≥3500	No	≥4700	No
OM5	≥3500	≥1850	≥4700	≥2470

Table 3 OM4 and OM5 fibre bandwidth index comparison

Summary, with the continuous improvement of application requirements, multimode fibre is developing towards the direction of

low bending loss, high bandwidth and multi wavelength division multiplexing. Among them, the most promising one is OM5 fibre, which has the current

optimal performance of multimode fibre and provides a powerful solution for the multimode wavelength system of 100Gb/s and 400Gb/s in the future.

2018 奔跑吧·光谷半程马拉松开跑 长飞最大规模跑团第1次出征 致敬追光路

2018 Half Marathon Kicks Off at Optics Valley Greatest Number of YOFC Runners Race for Glory for the First Time

◎ 本刊编辑部 | The Editorial

近日，由长飞公司倾情赞助的2018 奔跑吧·光谷半程马拉松在万众期待中开跑，从华中科技大学南门到东湖高新政务中心，21公里的路程超燃。

Recently, the long-awaited 2018 Half Marathon sponsored by YOFC kicked off at the Optics Valley, Wuhan, China. The 21km route from the south gate of Huazhong University of Science and Technology to the Public Service Center of the East Lake High-tech Development Zone, Wuhan made the runners boil.

◎ 长飞公司董事长马杰、执行董事兼总裁庄丹、副总裁 Jan Bongaerts 三大男神合体亮相

Chairman Ma Jie, Executive Director and President Zhuang Dan and Vice President Jan Bongaerts of YOFC attended the marathon together.



◎ 奔跑不一 young, 为勇于坚持的你们加油助威
"So Young", the runners





● 接力, 串联光谷 30 年发展历程

Pass on YOFC's strength throughout the 30-year development process of Optics Valley



● 长飞方阵向终点冲刺

YOFC team was rushing towards the finish line.



● 长飞公司最大规模跑团第 1 次出征

Greatest number of YOFC runners raced for the first time.

遇见 & 预见

回望 2018, 长飞喜事连连: 3 月, 2017 年业绩再创历史新高; 5 月, 长飞举办 30 周年庆典, 原信息产业部部长吴基传赞叹长飞是中外企业合作的典范, 是引进 - 消化 - 吸收 - 再创新的典范; 7 月, A 股上市, 长飞成为中国光纤光缆行业和湖北省唯一一家“A+H”双资本运作的上市公司; 10 月, 长飞喜获 2018 年欧洲质量奖, 成为该奖项设立 26 年来的第一家获奖中国企业; 11 月, 作为光通信企业唯一代表, 亮相“伟大的变革——庆祝改革开放 40 周年大型展览”; 12 月, 成功入选上证 380 指数样本股.....或许这些是对长飞 30 岁生日的别样献礼。

30 周年系列活动“老物件”、“三行情书”活动唤起了我们与长飞的绵延情愫、点滴故事。在 2019 新年钟声即将敲响的此刻, 还有哪些话想对 30 岁的长飞、想对过去的 2018 诉说, 对即将到来的 2019 又有怎样的期许, “遇见 & 预见”听你说。

制造中心 / 钟升

路漫漫其修远兮, 吾将上下而求索。早年非常幸运加入长飞大家庭, 见证长飞成为全球知名公司, 还有长飞人不忘初心, 砥砺前行, 勤劳苦干, 齐心协力铸造长飞棒纤缆全球第一。

长飞人追求质量, 精工匠心雕琢长飞辉煌。在长飞充满工匠精神的氛围里, 在领导、同事们、家人的支持帮助下, 我怀着矢志追梦匠人的初心, 为长飞的发展贡献力所能及的力量, 由一名懵懂的普通技术员成长为技术骨干高级工程师。感谢长飞给予我展现自我的舞台, 长飞厚待每一位付出辛勤劳动的员工, 提供发展机会。在长飞一切皆有可能。

即将逝去的 2018 年, 是长飞突飞猛进的一年, 长飞产销两旺, 国内外大奖纷至沓来, 这是长飞人砥砺前行、勇于奉献的结果, 作为长飞老员工, 倍感自豪。新的一年即将到来, 新征程任重道远, 愿 2019, 长飞好运, 2019, 长飞加油!



战略中心 / 曾云飞

长飞三十年的发展史, 无疑称得上是中国光纤光缆通信发展的缩影。与长飞共同成长的十年, 既是我职业生涯中收获最大的十年, 更是有幸见证长飞腾飞于全球光纤光缆行业顶峰的十载。

我从坐在新员工培训教室的学员, 倾听着长飞的历史, 到如今我走上讲台, 和一批批的新员工一同展望长飞的未来。十载长飞发展路, 抬望眼长飞砥砺情。愿长飞人一一携手同心, 筑梦未来。



研发中心 / 沈磊

四季在风中匆促的轮转，转眼已和长飞一起到达而立之年，我会怀念那些逝去的时光，那些明媚而伤感的素年锦时。往昔没有峥嵘岁月，却也有同学少年。每个人的心中，都会有属于自己的一方麦田，能够在白色的高光下守护它，便已是幸福。

渐渐的，光阴写意了一张不再年轻的脸。人到中年，简单而沉静，已明白人生少有鲜衣怒马少年风流，更多的却是冷炙残羹到处悲辛。然而更难的，是接受而不妥协，在苟且沉沦中始终坚守心中的诗和远方。开始向往平和安稳，也许每一天都没有那么美，却总有美好的东西存在。

流年似水，一路的聚聚散散中我们曾经围在一起取暖，风雨无惧。虽然我们总会收拾好各自记忆的行囊匆匆上路，各奔天涯。然而风景依然存在，那些承担过我们经历、分担过我们悲喜的人，总会在岁月流转中，定格为记忆里永恒的唯一。



长飞潜江公司 / 童培根

遇见“长飞”，我仿佛见到了惊世骇俗的航母，看他行驶在尖端科学的海洋里，一举斩获“中国光纤光缆最具竞争力企业10强”（第一名）、“全球光纤光缆最具竞争力企业10强”（第二名）、“中国光通信市场最具品牌竞争力企业10强”（第五名）、“2018中国光通信最具‘工匠精神’企业大奖”……而我只是这艘航母上一颗微不足道的螺丝钉，一颗依靠这艘航母的耀眼光环，在“自力更生，奋发图强”的人海中，比较骄傲的螺丝钉。

凡事预则立，不预则废，靠着大树好乘凉。我预见“长飞”在科学造福人类的长空里，将是领先高飞的鲲鹏，将是2019年“全球光纤光缆最具竞争力企业”，没有之一！

我是“长飞”航母上的一颗螺丝钉，我骄傲我自豪！！



长飞沈阳公司 / 张红玲

30岁的长飞，我与你同龄，我们都是八零后呢，相处起来似同龄人般的亲切和轻松，是缘分使我们相遇，期望你继续辉煌，我为你自豪！我与你同行！

2018年是收获满满的一年，虽然有迷茫但从未停下努力脚步；2019年必然是充满挑战的一年，期待内心更坚强的自己，期待崭新的自己！



Meet & Foresee

YOFC has plenty to smile about for the Year 2018. In March, the performance of 2017 set another record; in May, the 30th anniversary of YOFC was held. Wu Jichuan, former Minister of the Ministry of Industry and Information Technology praised YOFC as a model for Chinese and foreign business cooperation and for the mode of "introduction, learning, incorporation and output"; in July, with A-share listed, the only A+H dual-listed company in Chinese optical fibre and cable industry as well as in Hubei Province; in October, YOFC became the first Chinese company who won European Quality Award founded 26 years ago; in November, as the only representative of optical communication enterprises, YOFC appeared at a major exhibition commemorating the 40th anniversary of China's reform and opening-up; in December, YOFC was selected as a sample stock for SSE 380 Index. Maybe these events are special gifts for the 30th anniversary of YOFC.

A series of activities for the 30th anniversary, such as "old objects" and "three line love letter", evoke the emotions and stories between us and YOFC. On the occasion of the arrival of the New Year 2019, is there anything you want to talk about YOFC, the past Year 2018 and the coming Year 2019? We listen to you at Meet & Foresee.

Manufacturing Center Zhong Sheng

The way ahead is long; I see no ending, yet high and low I'll search with my will unbending. I am very lucky to have joined in YOFC and witnessed it becoming a world-renowned company. The employees of YOFC follow our original intention, strive to go ahead, and work hard, bringing YOFC No.1 in the global preform, optical fibre and cable industry.

The employees of YOFC go for quality and mold brilliance with quality products and originality. Enjoying the atmosphere of workmanship and under help of leaders, colleagues and families, I embraced the original intention of being a craftsman and devoted myself to the development of YOFC, growing up to a technology backbone and senior engineer from a general technician. Thanks to YOFC for providing a stage to show myself. YOFC pays well for all hardworking employees with opportunities. Everything is possible in YOFC.

The Year 2018 has saw YOFC growing by leaps and bounds. As a senior employee, I'm very proud to see that YOFC gained a lot in production and marketing, wining many domestic and foreign awards, which are the results of its employees hard working and devoting. A new year is coming and there is a long way to go, and I wish YOFC good luck in 2019! YOFC, go for it!

Strategy Center Zeng Yunfei

Undoubtedly, the 30 years history of YOFC can be regarded as an epitome of the development of the optical fibre, cable and communications industry of China. I grew up with YOFC in the past ten years in which I have got the most rewarding and was lucky to witness the rising of YOFC to the top of the global optical fibre and cable sector.

R&D Center Shen Lei

Four seasons coming again and again, I have turned to 30 years old with YOFC. I would miss lost time, and bright and sad prime years. Without eventful years in the past, there were schoolmates and younger selves. Everyone has its own dream. It would be a kind of happiness if you can protect your dream during your lifetime.

Years may wrinkle our skins. When turning to middle ages, people would become simple and calm, knowing that life is with less luxury and fancy, but more bitterness and suffering. It's even harder to accept without compromise, and to firmly hold our dreams in such a complex world. And we begin to long for peace and safe. Maybe every day is not so great, but there is always something beautiful.

In the flowing years, we gathered together for warm all the way, fearing no troubles and difficulties. Although we always hurry off and run for the life by our own, there are beautiful experiences, laughter and tears which all become our precious memories.

YOFC (Qianjiang) Tong Peigen

For me, YOFC is like a great aircraft carrier in a sea of science. It has won Top 10 Competitiveness Enterprises in the Optical Fibre and Cable Field of China (No.1), Top 10 Competitiveness Enterprises in the Optical Fibre and Cable Field of Global Market (No.2), Top 10 Brand Competitiveness Enterprises in the Optical Communications Field of China Market (No.5), the Beat Craftsman Spirit Enterprise in the Optical Communications Industry of China 2018, etc. I believe those awards are only tiny screws in the aircraft carrier, but they are worth being proud in such an environment of self-dependence and hard work.

Preparedness ensures success, and unpreparedness spells failure. It contributes to success that if you has a strong backing. I foresee that YOFC will be like a highflying roc in the sky where science brings benefits to humanity, and will be the most competitive enterprise in the optical fibre and cable field of global market in 2019!

I am a screw in the aircraft carrier of YOFC! And I am proud!

YOFC (Shenyang) Zhang Hongling

I am the same age as YOFC, and we are both post-80s, so it is relaxing and friendly to go along with it. It is destiny that makes us meet, and I am looking forward to more brilliance of YOFC. I am so proud of YOFC! And I will stay with YOFC!

There's only one month left for 2018 in which we have achieved a lot, with confusion but never stopping; the Year 2019 would be challenging, and I expect a strong and new me.

在这里,你不是一个人在战斗

长飞潜江公司 | 吴志勇

“不要打了,我已经‘死’了”。

11月4日在一个充满朝气的清晨,潜江市周矶某丛林和废弃仓库里,只闻杀声四起,枪声、惨叫声此起彼伏,大批手持M16枪支的“特警”与“恐怖分子”正在展开激战。这不是反恐激战现场,更不是拍电影,而是长飞光纤潜江有限公司(以下简称“长飞潜江公司”)组织的一场接近实战的“真人CS”野战拓展游戏。

上午9点整,长飞潜江公司工会动员讲话后,战斗警报正式拉响。率先进入战场的是第一战斗小队和第四战斗小队,两队队员都“火药味”十足,战斗一触即发。教官临场下发了战斗任务,本场为歼灭战,一方在规定时间内将另外一方队员全部歼灭即为获胜。两队队员在各自队长的带领下列达指定作战区域,相互深入敌后,用盾牌、掩体、废弃车辆作掩护,不时变换队形,相互小心翼翼用手势和口型与战友交流,试图突破对方防线。正在这时,一队突然释放烟雾弹从正面发起强攻,



双方迅速进入激战,战场烟雾弥漫。双方经过接近十分钟的激战,第四战斗小队终于被全数歼灭,战后双方队员相互拥抱握手,现场发出阵阵欢呼声。

接下来是第二战斗小队和第三战斗小队对抗,这两支队伍纷纷向已经撤出战斗的队伍请教战术,求分享战斗经验,一个个忙的不亦乐乎。随着教官一声令下,双方队伍进入主战场,由于这两支队伍里面都有女生,所以双方显得格外谨慎,第二战斗小队采用从侧翼迂回接近、两面夹击的战术进攻;第三战斗小队采用防守战术,最终第三战斗小队还是没能守住第二战斗小队的进攻落败。

二队队长给大家分享经验,在这里,我们不是一个人在战斗。团队拓展,重要的是我们在活动过程中,增加同事之间的交流,释放工作中的压力,明确团队协作的重要性。同时,这一类拓展活动能极大地激发我们的责任感、应变能力,思考当我们陷入困境时如何从容应对压力和挑战,带领我们的团队突破重围。



You Are not Alone in the Battle

● YOFC (Qianjiang) | Wu Zhiyong

团结协作, 在学习中成长

棒纤技术质量改进交流会感悟

● 长飞潜江公司 | 李军

"Stop fighting, I'm out".

In the sunny morning of November 4, in a jungle and an abandoned warehouse of Zhouji, Qianjiang City came the incessant shots and yelling. A number of "special policemen" with M16 were in a fierce battle with "terrorists". Counter-terrorism scene or movie shooting? Actually, it's a "Live CS" wild expansion game by Yangtze Optical Fibre (Qianjiang) Limited Company (YOFC Qianjiang).

At 9 a.m., YOFC Qianjiang raised the practice alarm after a pep talk. The 1st combat team and the 4th combat team firstly entered battleground. The two teams were shovel-ready for the explosive battle. The officers issued the combat mission as a war of annihilation that the team who killed all opponents would win within the stipulated time. Following command of two captains, the team members punched deep into enemy territory, hid behind shields, blindage and abandoned vehicles, sometimes changed formation, and carefully communicated with members with gestures and lip-reading. When they were going to penetrate the defense, one team suddenly adopted positive storm releasing smoke bomb. Smoking covering the field, the two teams were in fierce battle. After nearly ten-minute fierce battle, the 4th combat team finally were all killed. The two teams hugged and shook hands with each other, bursting waves of cheering. Next were the 2nd combat team and the 3rd combat team who both asked for instructions from the 1st and the 4th combat teams. All of them indulged in experience

sharing and learning. Following the order of the officers, both teams stepped into the field. They acted carefully considering girls in the teams. The 2nd combat team outflanked their opponents by flank march and attacked them from both sides, while the 3rd combat team bode their time who were finally defeated by their enemy.

Time flew by and a new campaign kicked off after lunch and a short break which was the final war and also a war of honor for excellent teams. The officers set a "decapitation" task that the team would win if they killed the other captain. Both sides adopted positive storm with enough brave which is the key to victory in fierce competition. Both immediately fought with each other, surrounded by shots of "boom, boom, boom" and cries. The girls of the 2nd combat team dared to go ahead who made use of terrain and objects to shot the other captain, bringing end to the war. The 2nd combat team won the trophy, and all of them took photos and were still lost in the scene.

Captain of the 2nd combat team shared experience, saying that "you are not alone in the battle". It is important to enhance the communication between colleagues, release the pressure of work and know the importance of teamwork in team games. Meanwhile, this kind of games can greatly stimulate our sense of responsibility and adaptability, make us think how to calmly cope with pressure and challenges and lead our team to break through the siege when we are in trouble.

在长飞潜江公司,月产量从爬坡到达产,从达产到超产,每天的发展都不一样。新工艺从研发生产阶段到大批量工业化生产过程中,难免会遇到一些问题。为了攻克难点,由技术部牵头、预制棒部和光纤部共同参与,开展了以“工艺技术讨论、质量问题解决、跨部门交流讨论、专业培训”为主题的棒纤技术质量改进交流会,交流会每一、两个月进行一次。

交流会给所有参会人员带来了如下的收获:

加强了棒纤工艺及设备的互相了解和学习。光纤部工艺工程师和生产主管进入预制棒车间学习,预制棒部的工艺人员会给他们耐心地讲解各个工序的工艺原理和设备构成,为后续做光纤质量分析打下坚实基础。同样,预制棒部工艺人员和生产人员也去光纤部车间进行了拉丝工艺的学习和了解。同时,质改组的两位质量工程师,也分别深入到预制棒和光纤部,一边学习工艺和产品,一边与生产部门的技术人员共同开展质量管控。通过彼此互相的了解和学习,知己知彼,共同把好质量关。

学习和掌握了专业分析工具。由技术部组织专业的质量分析工具培训,例如:QC小组、品质意识、老QC七大工具、新QC七大工具、Minitabs工具运用,让双方工程师在分析质量问题的时候,能够运用更多有效工具,用数据阐述问题,让整个团队更加专业化和职业化。

头脑风暴,群策群力。针对个别的质量目标未达标的突出

问题,集合多方人员智慧进行讨论,信息收集和改善对策方案整理;拟定出可行性方案,并进行跨部门之间的效果跟进和追踪,这让整个团队做到有效沟通,不仅可以充分协调,还可以群策群力,积极解决各种困难。

得到了专家们的耐心指导。当预制棒遇到难点时,潜江公司张宏胜技术总监将会参与交流会,进行专业指导和讲解;当光纤遇到难点时,潜江公司钱新伟副总经理会参与交流会,给予专业指导和意见。同时,由于潜江公司工程师团队较为年轻,制棒和拉丝经验还在积累,张宏胜积极邀请总部研发专业顾问到潜江公司进行制棒及拉丝工艺的专业指导。

实施QC项目。在2017年,我们共实施了8项QC项目,结合技术质量交流,这些项目最终都达到了很好的效果。

通过团队努力,潜江公司预制棒和光纤的各项质量指标均达标且超越2017年目标线。并且,长飞潜江公司通过参与集团组织的“全国质量奖”评审,在各部门、小组逐步建立起了每周内部培训和案例分享的学习与成长机制,使我们的新员工得以较快成长。

未来,长飞潜江公司将秉承“客户 责任 创新 共赢”的核心价值观,在“精益求精、品质卓越”的质量观引导下,不断学习,壮大发展,让公司文化融入到每一位员工的血液中。

Work in Cooperation, Grow in Learning

Reflections in the Exchange Meeting on Quality Improvement of Preform and Optical Fibre

◎ YOFC (Qianjiang) | Li Jun

In YOFC Qianjiang, the monthly output changes every day, from below target to reaching target to beyond target, and new processes are inevitably confronted with some problems from R&D and production to mass industrial production. To overcome these difficulties, the technology department would organize a meeting every one or two months with the preform department and optical fibre

department to discuss the quality improvement methods of preform and fibre, with the theme of "process technology discussion, quality problems solving, cross-department communication and professional training".

The exchange meeting has brought the following benefits for all participants:

It has strengthened our understanding and mutual



learning of preform and fibre technology and equipment. The process engineers and production supervisor of the optical fibre department have learned related knowledge in the preform workshop, where the technologists of the preform department patiently explained the principle and equipment composition of each process for them, laying a solid foundation for follow-up optical fibre quality analysis. As such, the technologists and production personnel of the preform department also went to optical fibre workshop to learn the fibre drawing technology. Meanwhile, two quality engineers of the quality improvement group also went to the preform department and the optical fibre department respectively to learn more processes and products while controlling product quality with technicians of the production department. Through mutual understanding and learning, we know each other better and can make joint efforts to improve the product quality.

We have learned more professional analysis tools. The technology department organized the training of professional quality analysis tools, such as QC group, quality awareness, seven old QC tools, seven new QC tools and Minitabs tools, enabling our engineers to use more effective tools and data when analyzing quality problems, which turned the whole team more specialized and professional.

We have come up with countermeasures via brainstorming. Focusing on problems of substandard quality, we pooled the wisdom of many colleagues to discuss, collect information and optimize countermeasures, and proposed feasible plans and followed up their effectiveness in different departments, by which we ensured the effective communication in the whole team, and can coordinate well

with each other and seek joint efforts to address various difficulties.

We obtained patient guidance from experts. Like professional guidance and explanation given by Zhang Hongsheng, Technical Director of YOFC Qianjiang, in producing preform whenever there are difficulties, Qian Xinwei, Vice General Manager of YOFC Qianjiang, will do the same in optical fibre producing. Due to relatively young and less experienced engineer team of YOFC Qianjiang, Zhang Hongsheng especially invited the professional R&D consultants from the headquarters to YOFC Qianjiang for giving professional guidance on preform fabrication technology and fibre drawing technology.

We have reaped a lot from QC projects. In 2017, we implemented a total of 8 QC projects with high technical quality.

With concerted efforts of the team, the quality of preform and optical fibre reached the standard and exceeded the target of 2017. In addition, by participating in the China Quality Awards evaluation organized by YOFC group, YOFC Qianjiang has gradually established a learning mechanism which carries out weekly training and case sharing in each department and group, through which our new colleagues can grow rapidly.

Facing to the future, YOFC Qianjiang will adhere to the core value of "Client Focus, Accountability, Innovation, Stakeholder Benefits", keeping learning and developing under the quality concept of "Continual improvement, The Pursuit of Excellent Quality", making the company culture a bond linking all of us.