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2017年2月　第1期　总第105期　The 1st Issue February 2017 Issue 105

YOFC TODAY

今日长飞

双月刊

2017年2月 第1期 总第105期

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2016 年 12 月 14 日，长飞非洲公司竣工典礼举行，长飞非洲公司将从国内输入最先进的光缆生产装备和技术，并将生产一系列新一代光缆，引领当地通信技术和宽带市场的发展。

The completion ceremony of YOFC (Africa) Co., Ltd. was solemnly held, YOFC (Africa) will inport the most advanced production equipment and technology of optical cable from China and provide part of cable products . Meanwhile, YOFC (Africa) will produce a new generation of optical cable to lead the development of local communication technology and broadband market.

长足发展，飞向巅峰

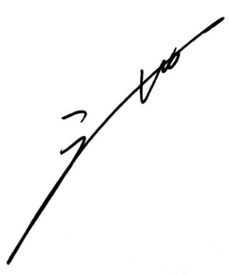
春回大地，万象更新。转眼间，我们送走硕果累累的2016年，迎来充满希望的2017年。2016年对于中国光纤光缆行业而言是充满机遇的一年。随着“宽带中国”国家战略的深入推进，我国三大电信运营商持续大力发展4G网络基础设施建设，同时在政府提倡的“互联网+”行动计划的推动下，国内光纤和光缆市场蓬勃发展。

在良好的市场环境下，通过全体长飞人的共同努力，2016年长飞公司销售额、利润和产销量等全面超额完成预算目标，创造了新的历史纪录，长飞公司已经成为全球第一大光纤预制棒、光纤和光缆供应商，三大核心业务全面实现“全球第一”！

不积跬步，无以至千里；不积细流，无以成江海。抚今追昔，在2016年中，长飞公司紧密围绕“全球第一，行业领袖”的总体目标，通过全产业链、多工艺路线经营深化光纤光缆业务，并持续推进国际化以及相关多元化。长飞公司在海内外的产业布局上更是取得了骄人的成绩：国内兰州公司投产，潜江科技园、浙江联飞公司开工建设，即将投产；国外印尼、南非子公司顺利投产，在印尼设立了新的光缆子公司，海外销售办事处增加至25个。可以说，长飞公司在“十三五”规划的开局之年，向董事会、股东交了一份满意的答卷。

这一年来，长飞公司的发展得到了各方的认可：我们连续十年被评为“中国光纤光缆市场最具竞争力企业10强”的第一名和“全球光纤光缆市场最具竞争力企业10强”的第二名；我们成功举办了CRU首届世界光纤光缆大会，众邀全球光纤光缆产业链的行业精英齐聚中国光谷；我们不仅入选全国首批“智能制造试点示范企业”，还成为中央媒体团报道的焦点，登上《新闻联播》等央视新闻栏目……长飞公司能取得这样的成绩，离不开所有长飞人的聪明才智和辛勤付出。

回顾过去，我们收获满满；立足今天，我们倍感珍惜；展望未来，我们豪情满怀。2017年，长飞公司将继续专注于光纤预制棒、光纤、光缆及相关技术的进步，以“联接改变生活”为己任，携手产业链各环节，发挥合力，推动整个行业可持续发展，为全球线缆事业的发展与繁荣注入新的活力、作出新的贡献。



Making Rapid Development to Reach the Highest Peak

☐ Zhuang Dan

Spring is a time for renewal and growth. In the twinkling of an eye we have bid farewell to the productive 2016 to embrace a promising 2017. For the Chinese Þbre and cable industry 2016 offered abundant opportunities and created substantial results. With the promotion of the "Broadband China" going further, the three major telecom operatorsin China devotedgreat efforts to the 4G network infrastructure construction.Driven by the "Internet Plus" initiative led by the central government, the domestic market of Þbre and cable boomed.

Thanks to the favorable market environment and the concerted efforts of all the members of staff, YOFC has over-fulfilled the plan and set new records in terms of revenue, margin as well as production and sales volume, etc., and become the largest supplier of optical preform, fibre and cable in the world, with all three core businesses achieving the goal of "global No.1"!

"A journey of a thousand miles may not be achieved without accumulation of each single step, just as the enormous ocean may not be formed without gathering every brook or stream."In the past year, focusing on the general goal of "to be No. 1 in the world and the leader of the industry",YOFC reÞned its fibre and cable business through the whole-industry-chain and multiple-technique approaches and continued to carry out its internationalization strategy and related portfolio diversification. We haveattained an impressive level of success in the industrial layout: domestically, the company in Lanzhou has been put into operation and the Qianjiang Science and Technology Park and Zhejiang Lianfei Optical Fibre and Cable Co., Ltd.have started construction and will soon be put into operation; internationally, subsidiaries in Indonesia and South Africa have successfully gone into operation, with a new optical fibre company established in Indonesia; the overseas sales offices have reached 25. It is fair to say that in the opening year of the Thirteenth Five-Year Plan (2016-2020) YOFC has delivered a satisfactory result to the board of directors and stakeholders.

In the past year, the development of YOFC have been widely recognized: we have beennamed NO.1 in the survey of "Top 10 Most Competitive Companies in the Chinese Fibre and Cable Market" and ranked NO.2 in the "Top 10 Most Competitive Companies in the Global Fibre and Cable Market" for ten consecutive years; we have successfully organized the Þrst edition of CRU World Optical Fibre and Cable Conference, which gathered fibre and cable talents from all over the world at China's "Fibre Optics Valley"; not only was YOFC selected as among the first 46 "Pilot Demonstration Companies on Intelligent Manufacturing", we have been intensively reported by media from central government and even appeared on XinwenLianbo, among other CCTV news programs...It is the ingenuity and endeavor of all our staff that has made YOFC as great as it is today.

Looking back on the past, we have sowed and reaped bountifully; at this moment, we are Þlled with gratitude. In 2017, YOFC will carry forward its dedication to the production of optical preform, fibre and cable, the development to related technologies and the mission of "Smart Link, Better Life". By tapping into the collaboration with all players of the industry chain, YOFC is committed to promoting the sustainable development of the entire industry, as well as invigorating and contributing to the development and prosperity of the global cause of Þbre and cable.

长飞非洲公司竣工，助力非洲信息化发展

□ 长飞非洲公司 彭国泰

2016年12月14日，长飞非洲公司竣工典礼在被誉为“非洲最佳管理城市”的南非德班隆重举行。南非夸祖鲁–纳塔尔省副省长西和乐·齐卡拉拉、湖北省副省长许克振、中国驻德班总领馆宁军领事、南非贸易及工业部副部长萨迪克·贾法尔、南非贸易及工业部主任珍妮·弗雷德里克斯莅临现场并表示祝贺。长飞公司总裁庄丹、长飞公司第一副总裁扬帮卡、长飞非洲公司总裁皮耶特·维乔恩、长飞非洲公司合资方马斯泰克股份有限公司董事长杜·加玛参加了竣工典礼。

湖北省副省长许克振在竣工典礼现场发表讲话，他指出，“近年来，在习近平主席与雅各布·祖马总统的大力推动下，中非合作突飞猛进。作为湖北省的企业代表、中国光谷的窗口示范企业，长飞公司投资非洲，与马斯泰克股份有限公司合资在南非建企，是湖北企业投资南非的典型代表。非洲和南非光纤光缆市场需求潜力巨大，长飞公司与马斯泰克股份有限公司合资的光纤光缆企业无疑是顺应潮流之举。”

长飞公司总裁庄丹在竣工典礼上致辞，庄总表示，中国和非洲虽相隔千里，却有着深刻的历史渊源与成功合作。如今，南非以及整个非洲地区互联网宽带用户不断增长，给电信行业提供了相当大的发展空间，因此，在这些区域投资将给长飞公司提供一个非常好的本地化生产平台，以面对即将增长的市场需求，为该区域的客户提供优质的产品和服务。未来，长飞非洲公司将立足南非，辐射整个非洲，力争成为南非乃至非洲地区最具影响力的光纤光缆供应商。

南非是非洲第二大经济体，拥有较完善的金融及法律体系，政治环境稳定。自南非政府大力推动国家宽带战略计划后，南非对光纤光缆需求大幅提高。依托我国“一带一路”发展战略，长飞公司自上市以来，已先后在缅甸和印尼合资建厂，如今长飞非洲公司完成竣工，此举将可打造联通欧、亚、非三个大陆和丝绸之路经济带光纤光缆战略，形成一个海上、陆地的光通信商业闭环。

长飞非洲公司将秉承长飞总部的企业发展方向，从国内输入最先进的光缆生产装备和技术，生产并提供在南非当地因技术瓶颈而无法制造的部分光缆产品。同时，长飞非洲公司将生产一系列新一代光缆，引领当地通信技术和宽带市场的发展。

The Completion of YOFC (Africa) Promotes the Information Development in Africa

☐ Peng Guotai from YOA

The completion ceremony of Yangtze Optical Fibre and Cable (Africa) Co., Ltd. (hereinafter referred to as "YOFC") was solemnly held in Durban, South Africa, praised as the "Best Managed City in Africa" on December 12, 2016. The vice-governor of KwaZulu-Natal Province in South Africa Sihle Zikalala , vice-governor of Hubei Province Xu Kezhen, consul of Chinese Consulate General in Durban Ning Jun, Vice-Minister of Trade and Industry Sadick Jaffar and directer of Ministry of Trade and Industry Janine Fredericks presented at the ceremony and extended their congratulations. Zhuang Dan, president of YOFC, Jan Bongaerts, first vice president of YOFC, Pieter Viljoen, president of YOFC (Africa) and Mdu Gama, chairman of Mustek Co., Ltd., joint venture partner of YOFC (Africa) attended the completion ceremony.

Xu Kezhen, vice-governor of Hubei Province delivered a speech at the ceremony. He said, " In recent years, under the impetus of President Xi Jinping and President Jacob Zuma, China-Africa cooperation has grown by leaps and bounds. As the representative enterprise in Hubei Province and the demonstration enterprise of Optics Valley of China (OVC), YOFC invested in Africa and set up joint venture with Mustek Co., Ltd. in South Africa, which is typical representative of Hubei enterprises' investment in South Africa. Since the potential demand of optical fibre and cable market in Africa and South Africa is enormous, the joint venture YOFC (Africa) created by YOFC and Mustek Co., Ltd. surely complies with the trend of the time.

Zhuang Dan, president of YOFC addressed at the ceremony. He said that although China and Africa are separated by thousands of miles, there existed profound historical origins

and successful cooperation. Today, the ever increasing of Internet broadband users in South Africa and the whole Africa provides large developing space for telecommunication industry. Therefore, the regional investment will supply a great localized production platform for YOFC to meet the growing market demand and provide quality products and services for customers in the region. In the future, YOFC (Africa) will expand business from South Africa to the whole Africa, striving to be the most influential optical fibre and cable supplier in South Africa and even in Africa.

South Africa is the second largest economy in Africa with relatively complete financial and legal system and stable political environment. Since South African government strongly promotes national broadband strategy plan, the demand of optical fibre and cable in South Africa has massively increased. Following "Belt and Road" Initiative, YOFC has successively built joint-venture plants in Burma and Indonesia since its listing. The completion of YOFC (Africa) will forge an optical fibre and cable strategy which connects Asia, Europe and Africa three continents and the Silk Road Economic Belt and form a business closed cycle of optical communication between sea and land.

Adhering to the development direction of YOFC headquarters, YOFC (Africa) will inport the most advanced production equipment and technology of optical cable from China and provide part of cable products which South Africa could not produce due to technical bottleneck. Meanwhile, YOFC (Africa) will produce a new generation of optical cable to lead the development of local communication technology and broadband market.

行业唯一，荆楚骄傲

——长飞公司荣膺第一批制造业单项冠军示范企业

□ 战略中心 曾云飞

2017年1月23日，工业和信息化部、中国工业经济联合会联合公布了第一批制造业单项冠军示范企业和培育企业名单，长飞公司荣膺制造业单项冠军示范企业，成为国内光纤光缆行业中唯一一家获此殊荣的企业。

“制造业单项冠军”包含两方面内涵：一是“单项”，企业必须专注于目标市场，长期在相关领域精耕细作；二是“冠军”，要求企业应在相关细分领域拥有冠军级的市场地位和技术实力。从“制造业单项冠军”的内涵可以看出，首批入选企业在制造业产业链中居于十分重要的位置，是制造业创新发展的基石和竞争力的重要体现。作为全球第一大光纤预制棒、光纤和光缆供应商，长飞公司在光纤光缆行业精耕29年，在光纤光缆新产品、新工艺开发、光纤设备开发等各方面都取得了突出成就，技术实力全球领先，荣获光纤光缆行业中唯一的“单项冠军”可谓实至名归。

工业和信息化部开展的这项评选单项冠军企业活动，对贯彻落实《中国制造2025》，突破制造业关键重点领域，促进制造业迈向中高端意义重大。为践行《中国制造2025》，提升企业整体效能，长飞公司正积极推行智能制造，于2015年7月作为行业唯一代表成为首批入围工业和信息化部确定的46家智能制造试点示范企业之一。2016年11月，长飞公司更是成为中央媒体“中国制造2025调研行”专题采访活动的重点采访对象，接受了《人民日报》、中央电视台等多家中央媒体的专题报道。

作为示范企业，长飞公司将继续发挥自身优势，加强与领先的智能制造企业合作，积极探索光纤线缆产业智能制造标准模式，建设智慧工厂，构建光纤光缆行业智慧工厂解决方案，全面实现“全球第一，行业领袖”的战略目标。

The Only One in the Industry, the Pride of Hubei
——YOFC Becomes One of the First Individual Champion Demonstration Enterprises of Manufacturing

☐ Zeng Yunfei from Strategic Center

Ministry of Industry and Information Technology and China Federation of Industrial Economies jointly announced the list of the first individual champion demonstration enterprises and foster enterprises in manufacturing on January 23, 2017. Winning the reward as individual champion demonstration enterprise of manufacturing, YOFC has become the only enterprise to be granted this honor in domestic optical Þber and cable industry.

"Individual Champion of Manufacturing" contains two aspects: One is "individual". The enterprise must focus on the target market and intensively cultivate in related fields over a long period of time. The other is "champion". The enterprise should have the market position and technical strength of champion quality in the relevant subdivision. It can be seen from the connotation of "Individual Champion of Manufacturing" that the first selected enterprises occupy important positions in manufacturing industry chain and are important embodiment of the cornerstone and competitiveness of manufacturing innovation development. As the world's largest supplier of fiber preform, optical fiber and cable, YOFC has focused in optical fiber and cable industry for 29 years and has gained outstanding achievements in the development of new products and technology in optical fiber and cable and the development of optical fiber equipment. With world's leading technical strength, the award as the only individual champion in optical fiber and cable industry is well deserved.

Carried by Ministry of Industry and Information Technology, the selection activity of individual champion is of great importance to implement Made in China 2025, break through the key areas of manufacturing industry and promote the manufacturing industry towards high-end. In order to fulfill Made in China 2025 and improve overall efficiency of the enterprise, YOFC actively promotes intelligent manufacturing and became one of the first 46 intelligent manufacturing pilots confirmed by Ministry of Industry and Information Technology as the sole representative of the industry in July, 2015. In November, 2016, YOFC was the key interviewee in "Made in China 2025 Research" special interview held by central media and received special reports by the People's Daily, CCTV and other central media.

As a demonstration enterprise, YOFC will give full play to its advantages, strengthen the cooperation with leading intelligent manufacturing enterprises, explore the standard mode of intelligent manufacturing in optical fiber and cable industry, establish smart factory, build the solutions to smart factory in optical fiber and cable industry and fully achieve the strategic objective " World's First, Industry Leader".

长飞公司2016年版《集体合同》签字仪式隆重举行

□ 本刊编辑部

2016年12月26日，长飞公司2016年版《集体合同》签字仪式隆重举行，劳方首席代表长飞公司党委副书记、工会主席王沙京，以及劳方代表制造中心副总经理程景飞、许定昉，预制棒部经理助理杨武，特种产品事业部经理助理吴正超等参加；资方代表长飞公司总裁庄丹、副总裁张穆、制造中心总经理江志康、人力资源行政部经理李璇等参加。合同文本签字后提交至相关劳动部门审核，劳动部门对该合同无异议，该合同在签字15日后生效执行，生效执行后公司印制成册发给所有员工并进行了宣贯。

长飞公司2016年版《集体合同》修订工作于2016年7月初拉开序幕，在5个多月的过程中，经过选举员工代表、收集员工意见、劳资双方会议协商等程序后，员工代表对草案进行了表决，表决通过后正式签署劳动合同文本。本次《集体合同》的签订以法律要求为基准，在结合公司实际的基础上最大限度地满足员工提出的要求，提高员工待遇。

在签字仪式上，公司总裁庄丹首先对本次《集体合同》的修订内容进行了阐述，本次修订主要包括八点内容：

一、员工试用期满至工作满一年期间，员工工资在其标准工资的90%、95%两个档次基础上，增加了100%这一档次；

二、员工每个月的加班时间，由不超过8小时调整为不超过12小时；9.5级及以上员工加班由不能调休调整为可以调休；

三、夏季高温补贴纳入集体合同；

四、外地员工探亲待遇纳入集体合同，并起草了相关管理办法；

五、绩效考核流程中增加了申诉程序，对考核结果有异议的员工可按公司规定进行绩效考核申诉；

六、员工违纪的处罚从集体合同转入员工手册；

七、取消了内退的相关条款；

八、原合同中“员工提出调整岗位的要求，公司需进行安排”存在歧义，取消该条款。

庄总表示，公司《集体合同》修订的传统是非常好的，劳资双方以集体协商的形式修订合同，既关注员工诉求，又考虑公司的实际状况，劳资双方的平衡对公司发展而言意义重大。

随后，公司党委副书记、工会主席王沙京代表工会感谢各方为本次集团合同修订所做的细致工作，感谢劳资双方的协商代表充分考虑了不同岗位、不同级别、不同性别的职工意见。王主席表示，本次是公司第十次修订《集体合同》，也是公司上市后第一次修订，围绕薪酬、工时等职工所关心的问题修订了八项条款，基本上达到了本次修订的目的。

同时王主席对本次《集体合同》的修订也提出了3点要求：宣传好、贯彻好、落实好。很多职工对公司的《集体合同》了解不够，要充分利用《今日长飞》、微信公众号等公司宣传介质做好集体合同的宣传工作，同时劳方、资方都要严格按照合同约定履行义务、行使权力，广大职工要真正做到对公司集体合同的一次性理解、一次性认同、一次性执行。

YOFC Collective Contract (Edition 2016) Signing Ceremony Was Solemnly Held

☐ The Editorial

YOFC Collective Contract (Edition 2016) Signing Ceremony was solemnly held on December 26, 2016. Chief employee representative, deputy party secretary & Labor Union chairman Wang Shajing, employee representatives including deputy general manager of manufacturing center Cheng Jingfei and Xu Dingfang, assistant manager of preform department Yang Wu and assistant manager of special products department Wu Zhengchao and employer representatives including president Zhuang Dan, vice president Zhang Mu, general manager of manufacturing center Jiang Zhikang, HR & Admin manager Li Xuan attended the ceremony. The signed contract was submitted to relevant labor department for approval. The labor department had no objection to the contract and it was executed in 15 days after signing. After execution, the contract was printed to all employees and was promoted by the company.

The revision of YOFC Collective Contract (Edition 2016) began in early July, 2016. In 5 months, after the election of staff representatives, the collection of staff opinions, negotiations between labor and management and other procedures, the staff representatives voted on the draft and formally signed the labor contract after the vote was adopted. Based on legal requirements and the actual situation of the company, the contract maximally met the requirements of the staff and improved the employee treatment.

During the signing ceremony, president Zhuang Dan expounded the revision of Collective Contract. The revision content mainly includes 8 points:

1. From the expiration of probation to a full year, the employee salary increased the grade of 100% on the basis of 90% and 95% of standard wage.

2. Overtime per month was adjusted from no more than 8 hours to no more than 12 hours. The overtime of employees of level 9.5 and above was changed from nonadjustable to adjustable.

3. High temperature subsidies were included into Collective Contract.

4. Home subsidies of out-of-town employees were included and relevant regulations had been drafted.

5. The grievance procedures were added in the performance appraisal process. Employees with objections to assessment results could appeal according to company regulations.

6. Disciplinary punishment of employees was shifted from Collective Contract to employee handbook.

7. The relevant clause of early retirement was canceled.

8. The clause "when the employee proposes to adjust the position, the company needs to arrange for it" in the original contract is ambiguous and it was canceled.

President Zhuang said that, the tradition of collective contract amendment was very good. The labor and management revise the contract in the form of collective bargaining, which focuses both on employee demands and the actual situation of the company. The balance of labor and management is of great significance to the development of the company.

Subsequently, on behalf of the Labor Union, deputy party secretary & Labor Union chairman Wang Shajing thanked all parties for their meticulous work on the revision of the contract and thanked consultative representatives of labor and management for their consideration of the employee opinions of different posts, levels and genders. Chairman Wang said that, this is the tenth revision of the Collective Contract and the first revision after the listing. Eight articles about salary and working hours concerned by the staff were revised, basically meeting the purpose of this revision.

Meanwhile, chairman Wang proposed 3 requirements to the revision: good publicity, good implementation and good execution. Many employees are not familiar to the contract, so promotions by YOFC Today, WeChat Subscription and other medium should be done perfectly. Labor and management should fulfill the obligations and exercise the power in strict accordance with the contract, while all the employees should understand, identify and implement the contract at once.

长飞公司召开员工恳谈会

□ 本刊编辑部

2017年1月18日，长飞公司召开了员工恳谈会，公司总裁庄丹，党委副书记、工会主席王沙京，副总裁扬邦卡，副总裁张穆，副总裁闫长鹃以及400余名职工代表参加了本次会议。

公司总裁庄丹首先向职工代表们介绍了公司2016年的总体发展情况，分析了2017年公司所面临的市场形势，同时指出了在未来工作中需进一步改进的地方。庄总指出，2016年在全体员工的共同努力下，长飞公司光纤预制棒、光纤、光缆的销售量均实现了全球第一，2017年形势仍然非常好，大家要“撸起袖子加油干”，争取在2017年创造更好的业绩。

随后，员工代表纷纷从职工福利、公司管理等方面向公司管理层提出问题和建议，公司领导对职工代表的问题认真解答，尤其是对年终奖金、青年职工联谊等关系到基层职工切身福利的问题当即给出答复，赢得了职工代表们的阵阵掌声。

公司党委副书记、工会主席王沙京作为劳方代表发表讲话，对广大职工提出了三点意见和建议：一、要加强学习，提高自身技能，实现与公司的共同进步；二、要努力拼搏，尤其是一线员工同志很辛苦，要发挥苦干精神；三、要率先垂范，共产党员、共青团员要在各自的岗位上发挥模范带头作用。

YOFC Held An Employee Talkfest

□ The Editorial

On January 18, 2017, YOFC held an employee talkfest. President Zhuang Dan, deputy party secretary & Labor Union chairman Wang Shajing, deputy CEO Jan Bongaerts, deputy CEO Zhang Mu, deputy CEO Yan Changkun and more than 400 staff representatives attended the talkfest.

President Zhuang first introduced the overall development of the company in 2016 and analyzed the market situation faced by the company in 2017. Meanwhile he pointed out areas for further improvement in future work. He said that, with the joint effort of all employees, the sales of optical fiber preform, optical fiber and optical cable achieved the first in the world in 2016. The situation is still good in 2017, so we should struggle for a better performance in 2017.

Subsequently, staff representatives raised questions and suggestions from the aspects of employee benefits and corporate management. The company leaders gave serious answers to the questions of staff representatives, especially to the questions closely related to the basic welfare of grass-root workers including year-end bonus and sociables between youth staff, which received much applause from staff representatives.

Deputy party secretary & Labor Union chairman Wang Shajing addressed as employee representative. Three suggestions were made for the employees: First, reinforce learning, improve skills to achieve common progress with the company. Second, work hard especially for front-line staff and carry forward the spirit of hardworking. The last one is setting examples. Communists and League members should play a leading role in their respective posts.

长飞公司应邀参加2016“宽带中国”城市发展市长论坛暨“宽带中国”示范城市建设成果展

□ 本刊编辑部

2016年12月16日，由工业和信息化部、国家发展和改革委员会指导，新华网、宽带发展联盟联合主办的2016“宽带中国”城市发展市长论坛暨“宽带中国”示范城市建设成果展在北京举行，长飞公司副总裁张穆应邀参会，并进行了题为《专注技术创新，服务“宽带中国”》的主题演讲。

国务院发布“宽带中国”战略实施方案后，宽带网络成为国家战略性公共基础设施，光纤光缆行业也迎来了新的发展机遇。作为行业领先企业，长飞公司积极响应和支持“宽带中国”政策，在骨干网、数据中心建设等方面加速技术与产品创新，积极推动智慧园区（社区）发展，助力农村“光改”，面向市场提供了众多优秀的解决方案。

本届论坛上还举行了“宽带中国”示范城市最佳实践颁奖授牌仪式，长飞公司荣获“‘宽带中国’优秀技术创新奖”以及“‘宽带中国’优秀基础设施服务奖”两项殊荣。

YOFC Was Invited to Attend 2016 “Broadband China” Urban Development Forum & “Broadband China” Demonstration City Construction Exhibitio

□ The Editorial

“Broadband China” Urban Development Forum & “Broadband China” Demonstration City Construction Exhibition, guided by Ministry of Industry and Information Technology and National Development and Reform Commission and jointly organized by Xinhuanet and Broadband Development Alliance was held in Beijing on December 16, 2016. Zhang Mu, vice president of YOFC was invited to the forum and delivered a keynote address named “ Focus on Technological Innovation, Serve for Broadband China”.

After the State Council released the implementation plans of “Broadband China” strategy, broadband network has become a national strategic public infrastructure, while optical fiber and cable industry has also ushered in a new development opportunity. As the leading enterprise in cable industry, YOFC positively responses and supports the "Broadband China" policy, accelerates the innovation of technology and products in the construction of backbone network and data center, promotes the development of smart park (community), helps the fiber reforming in rural areas and offers many excellent solutions oriented towards markets.

The forum also held the awards ceremony of the best practice of “Broadband China” demonstration city. YOFC won “Broadband China” Excellent Technology Innovation Award and “Broadband China” Excellent Infrastructure Service Award.

长飞公司受邀参加
2016 中国移动全球合作伙伴大会

□ 战略中心 阎传文

2016年12月19～21日，2016中国移动全球合作伙伴大会在广州保利展馆举办，本次大会以“和你，连接梦想”为主题，在17000平方米的场馆打造了多个全新智慧生活图景。大会由中国移动通信集团公司主办，阿里巴巴、腾讯、百度等众多中国ICT前100强企业参与，大会吸引了6000余名行业精英争相莅临，超20万人到会观展。

长飞公司作为主办方唯一邀请的光纤光缆供应商参加了此次大会，并携气吹微管微缆、全干式室外光缆、应对路由紧张光缆、分布式基站布线、隐形缆室内布线等线缆解决方案参与展会，吸引了大批嘉宾与观众前来参观咨询，不少新老客户来到展位观展，并进行深入洽谈。

作为中国移动核心的光纤光缆供应商之一，未来长飞公司还会在新型光缆领域、基站回传领域、综合布线领域、特殊应用领域推出更多的解决方案，继续专注技术创新，服务“宽带中国”战略。

YOFC Was Invited to Participate in China Mobile Global Partners Conference 2016

□ Yan Chuanwen from Strategic Center

On December 19 - 21, 2016, China Mobile Global Partners Conference 2016, with the theme of “connect dream with you”, was held in Guangzhou-based Poly World Trade Center Exhibition Hall.. There were many new smart life prospects in the hall of 17,000 square meters. The conference was hosted by China Mobile Communications Corporation. Numerous Chinese ICT top 100 enterprises participated, including Alibaba, Tencent and Baidu. The conference attracted more than 6,000 industry elites and 200,000 visitors.

As the only fiber optic cable supplier invited, YOFC participated in the conference and brought the air-blown microduct microcable solution, all-dry outdoor optical cable solution, optical cable solution for route shortage, cabling solution for distributed base station and integrated cabling solution for invisible cable to the exhibition, attracting amounts of guests and visitors to come and consult, among which many new and old customers visited and made further negotiation.

As one of the major optical fibre and cable suppliers for China Mobile Communications Corporation, YOFC will launch more solutions in the fields of new-type optical cable, backhaul, premises distribution and special applications in the future and continue to focus on technological innovation and make contributions to “China broadband” strategy.

长飞公司与印尼PT FOTI合资成立光缆公司

□ 战略中心 瞿颖

2017年1月4日，长飞公司与印尼PT Fiber Optik Teknologi Indonesia公司（以下简称“PT FOTI”）在新加坡签署了合资成立光缆制造公司的合作协议，该项目实缴资本为1400万美元，合资双方持股比例为70:30（长飞70%，PT FOTI 30%）。新成立的光缆制造公司是长飞公司继2015年1月成立长飞光纤印尼有限公司之后在印尼成立的第二家合资企业，项目建成之后将会形成200万芯公里光缆生产能力。

长飞公司拥有良好的品牌和先进的技术，PT FOTI在印尼拥有良好的政府和客户关系，熟悉当地电信市场，两家企业强强联合、互惠合作将有利于实现双方资源互补，提升核心竞争力。新公司在整合双方股东资源的基础上，立足印尼，辐射周边国家和地区，将力争成为印尼和东盟地区最具影响力的光缆制造商。

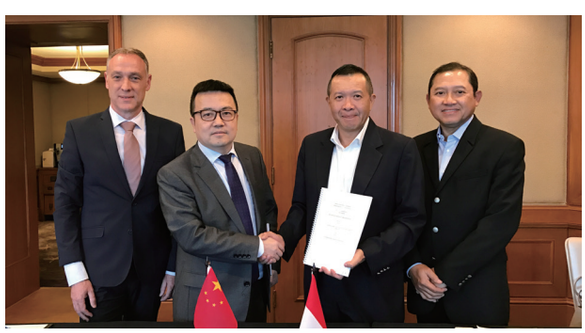
本次合作将使长飞公司在印尼拥有完善的光纤光缆产业链，标志着长飞国际化战略步伐进一步加快，是长飞走向海外的又一里程碑。

YOFC and PT FOTI Establishes a Cable Joint Venture

□ Qu Ying from Strategic Center

A cooperation agreement on establishing a cable joint venture was entered between Yangtze Optical Fibre and Cable Joint Stock Limited Company (hereinafter referred to as "YOFC") and PT Fiber Optik Teknologi Indonesia (hereinafter referred to as " PT FOTI") in Singapore on January 4, 2017. The paid-in capital of the joint venture is 14 million dollars, with the share proportion being 70: 30 (70% by YOFC and 30% by PT FOTI). The newly established cable joint venture was YOFC's second joint venture in Indonesia, whose first joint venture named Yangtze Optical Fibre and Cable (Indonesia) Co., Ltd. was established in January 2015. After completion, the joint venture will have a cable production capacity of 2 million core kilometers.

YOFC has good brand image and advanced technologies, while PT FOTI has good relationships with local government and customers and is familiar with local telecommunications market. Therefore, the combination and mutual cooperation between both enterprises will be propitious to realize complement of resources and enhance core competitiveness. Based on the



integration of shareholders' resources, the joint venture will expand business from Indonesia to surrounding countries and regions, striving to be the most inßuential cable manufacturer in Indonesia and ASEAN.

YOFC will establish a sound industry chain of optical fibre and cable through the cooperation, which is another milestone of YOFC to go overseas, marking that the internationalization strategy of YOFC has further accelerated.

长飞公司、中标软件、长芯盛达成合资协议，合力开创全光桌面云平台

□ 本刊编辑部

2016年12月13日，长飞公司、中标软件有限公司和长芯盛（武汉）科技有限公司正式达成合资协议，中标软件将入股长飞公司和长芯盛公司成立的合营公司——武汉芯光云信息技术有限责任公司（以下简称芯光云公司）。

芯光云公司是继长飞公司成立长芯盛公司，进入光通信IC设计行业后，进一步向下游延伸的、为终端客户提供多用户计算机共享桌面虚拟化方案的公司。在云计算、虚拟化、信息化成为行业发展趋势的背景下，芯光云公司凭借其方案性价比高、安全可靠、易于管理、节约能源的特点和率先实现万兆光纤到桌面的差异化优势，在短短数月内快速发展，迅速跻身国内桌面虚拟化重要供应商之列。

中标软件是国产操作系统龙头企业，其加盟使得芯光云公司如虎添翼，一跃成为全球屈指可数的拥有完整、强大的虚拟化软硬件开发能力的公司。长飞公司、中标软件和长芯盛公司的合作，标志着长飞公司多元化战略发展进入新阶段，在传统光通信行业持续领先之外，长飞公司将借助全光桌面云平台逐步深入到政府、企业、校园、网吧和家庭，用实际行动践行着“联接改变生活”的企业使命。

YOFC,CS2C and EverPro reach a joint venture agreement，Initiating a Stage for All-optical Desktop Cloud Together

□ The Editorial

On December 13, 2016, YOFC (Yangtze Optical Fibre and Cable Joint Stock Limited Company), CS2C (China Standard Software Co., Ltd) and EverPro Technologies reached a formal joint venture agreement. CS2C will takes stakes in E3Cloud Information Technologies Company Ltd. (E3Cloud), which was jointly established and operated by YOFC and EverPro Technologies.

After the founding of EverPro Technologies,YOFC entered the optical communication IC design business. And E3Cloud expands the terminal business by providing terminal client with the multiple-access computer sharing desktop virtualization solution. At the background of cloud computing, virtualization and informatization becoming the business developing trend, E3Cloud ranks among the important suppliers of domestic desktop virtualization with its advantages of high cost-effectiveness, security and reliability, manageability, energy saving, and initiative realization of applying ten gigabit optical fiber into desktop in several months.

CS2C is the leading enterprise of homebred operating system. Its joining strengthens the power of E3Cloud and makes E3Cloud among the several companies in the world which have the complete and powerful capacity to explore the virtualization software and hardware. The corporation of YOFC, CS2C and EverPro Technologies marks the new stage of YOFC's development of diversification strategy. YOFC not only leads the traditional optical communication industry, but also covers the service for the government, campuses, internet bars and families, practicing the mission of “Connections change the life.”

金鸡贺岁　拼搏进取
——记长飞沈阳公司2016年公司年会

□ 长飞沈阳公司 何小琼

2017年1月14日，长飞沈阳公司2016年年终表彰大会暨2017年新春联欢会在铁岭隆重召开，来自公司的百余名员工齐聚一堂，共飨盛典。

公司总经理刘国峰虽然因公事无法到达年会现场，但也通过VCR给全体员工带来了新年祝福。公司技术总监杨笛雨在年会上进行了慷慨激昂的2016年度总结及2017年公司未来规划演讲，让全体员工对长飞沈阳未来的发展有了更大的期待。

年会上颁发了2016年长飞沈阳公司优秀员工、生产之星、突出贡献奖，对在2016年为长飞沈阳做出贡献的员工们给予了肯定，综合部经理齐春雨、财务部经理门福军及东北销售团队的肖恩为获奖人员颁奖。此次年会特别设立一项特殊贡献奖，由技术总监杨总颁发给长飞国内营销总部东北办事处，感谢该团队2016年对长飞沈阳公司工作的支持。

表彰大会结束后，现场举办了2017年新春联欢会，同事们准备的团体游戏将现场气氛推向了高潮，长飞沈阳大家庭的温暖感染着每一位员工。长飞沈阳公司是一支年轻的团队，需要鼓舞，也需要历练，在以后的道路上长飞沈阳团队将团结一心、奋勇拼搏、越走越远。

Celebrate the New Year, Struggle for Success — 2016 Annual Meeting of YOFC (Shenyang)

□ He Xiaoqiong from YOFC (Shenyang)

YOFC (Shenyang) 2016 Year-End Commendation Conference & 2017 Spring Party was solemnly held in Tieling on January 14, 2017. More than 100 employees attended the party.

Although the general manager Liu Guofeng didn't attend the annual meeting for business reasons, he sent new year wishes to all employees through VCR. Technical director Yang Diyu delivered a speech about the annual summary of 2016 and the planning of 2017, which gave all employees expectations to the future of YOFC (Shenyang).

During the annual meeting, awards of excellent employee, production star and outstanding contribution were given to those who contributed to the company in 2016 as confirmation. Comprehensive department manager Qi Chunyu, financial department manager Men Fujun and the member of northeast sales team Xiao En awarded prizes to the winner. A special contribution award was given to northeast office of Domestic Marketing Headquarters issued by technical director to thanks for their support to YOFC (Shenyang) in 2016.

After the commendation conference, 2017 Spring Party was held. The group games prepared by colleagues brought the atmosphere to a climax. Each employee was touched by the warmth of YOFC (Shenyang) family. YOFC (Shenyang) is a young team which needs inspiration and experience. In the future, YOFC (Shenyang) will unite and struggle to blaze a longer and broader path forward.

长飞公司喜获
“2016 中国融资上市公司大奖——最具投资价值奖”

□ 战略中心 柳青

2017年1月12日，由《中国融资》主办的“中国融资上市公司大奖”庆典在香港隆重举行，长飞公司应邀参加本次活动，并获“2016中国融资上市公司大奖——最具投资价值奖”。

“中国融资上市公司大奖”致力于评选出香港上市公司及其管理团队的优秀典范，表彰过去一年中其在商界的杰出表现，透过此奖项让公众与投资者更了解获奖企业过去一年的业绩表现，令企业形象及旗下品牌更深入民心，也为投资者指明极具参考价值的投资方向。包括长飞公司、中国电力、国泰君安在内的29家企业荣获“2016中国融资上市公司大奖——最具投资价值奖”。

此次获评“2016中国融资上市公司大奖——最具投资价值奖”，是继长飞公司2016年底荣获《彭博商业周刊/中文版》“年度上市企业2016”、“最具投资价值奖”两项荣誉后的又一殊荣，再次有力体现了香港地区资本市场对长飞公司的高度认可。

YOFC Won “2016 China Awards for Listed Finance Company
—the Company with the Most Investment Value”

□ Liu Qing from Strategic Center

On January 12, 2017, the celebration of the “awards for the listed finance companies” was hosted by China Financial Market in Hong Kong. YOFC was invited and participated in this celebration and won “2016 China Awards for Listed Finance Company—the Company with the Most Investment Value”.

“China Awards for Finance Company” aims at selecting the excellent models among the Hong Kong listed company and their management team and praising their outstanding performance in the past year. These awards are conductive to the comprehension of the public and investors on the performance of the companies. The awards make the public know more about the companies and the sub-brands and indicate the valuable investment orientation. Twenty-nine companies including YOFC, China Power and Guotai Junan Securities won “2016 China Awards for Listed Finance Company—the Company with the Most Investment Value”.

YOFC’s winning of “2016 China Awards for Listed Finance Company—the Company with the Most Investment Value” is another important laurel after “2016 Annual listed Enterprises” and “the Company with the Most Investment Value” hosted by Chinese version of Bloomberg Businessweek at the end of 2016, proving again the high admitting of Hong Kong capital markets to YOFC.

长飞公司荣膺2016年度国家知识产权示范企业

□ 研发中心 王玉

近日，国家知识产权局公示了2016年度国家知识产权示范企业和国家知识产权优势企业评审和复核结果，长飞公司榜上有名，荣膺2016年度国家知识产权示范企业。

近年来，为践行“中国制造”向“中国智造”的转变，长飞公司积极推进企业科技创新和知识产权工作。在2013年，长飞公司荣获第一批国家知识产权优势企业荣誉称号，经三年国家知识产权优势企业培育期满，并通过复核，长飞公司进一步申报国家知识产权示范企业，经省知识产权局择优推荐，国家知识产权局组织评审，长飞公司成功夺得国家知识产权示范企业桂冠。

未来，长飞公司将以自身在光通信行业的影响力和履行企业社会责任行为的感召力影响我们的员工，影响我们的供应商，影响我们的用户，影响我们所有的利益相关者，在技术创新与知识产权保护的道路上坚定前行。

YOFC Entitled as 2016 Annual National Intellectual Property Model Enterprise

□ Wang Yu from R&D Center

Recently, SIPO (State Intellectual Property Office) announced the selecting and checking result of 2016 Annual National Intellectual Property Model Enterprises and Advantage Enterprises. YOFC was on the list and entitled as 2016 Annual National Intellectual Property Model Enterprise.

In recent years, in order to practice the transform from “made in China” to “Chinese Wisdom-creation”, YOFC actively promoted the technological innovation and intellectual property. In 2013, YOFC was among the first group of National Intellectual Property Advantage Enterprises. After three-year training period, YOFC passed the second-round evaluation and applied for entering the list of National Intellectual Property Model Enterprises. With the preferential recommend of provincial Intellectual Property Office and the evaluation of SIPO (State Intellectual Property Office), YOFC had the honor to win the title of National Intellectual Property Model Enterprise.

In the future, YOFC will positively inspire our staff, our suppliers, our users and all the stakeholders with our influence in optical communication industry and enterprise social responsibility. We are advancing firmly in the road of technological innovation and intellectual property protection.

长飞公司荣获2016中国通信产业大会多项殊荣

□ 战略中心 张方海

2016年12月27日，2016中国通信产业大会暨第十一届中国通信技术年会在北京隆重举行，此次年会重磅发布“2016中国通信产业年度十大事件”、“2017通信产业年度十大技术趋势”、“2016通信产业年度金紫竹奖”等。

长飞公司在本次大会上一举囊获多项大奖：长飞公司荣获“2016中国通信产业年度光通信领军企业”，长飞公司远贝®超强超低衰减大有效面积光纤获评“2016中国通信产业年度优秀产品”，长飞公司研发中心总经理王瑞春荣获“2016中国通信产业年度技术人物”。

此次大会以“大连接下的机会和挑战”为主题，邀请业界知名专家、运营商和企业技术大咖带来5G、网络重构、物联网、光网络等领域的16个主题报告。长飞公司资深专家张方海在会上发表了题为“新型光纤技术助力大连接变革”的演讲，重点介绍了超低衰减大有效面积G.654光纤、宽带OM5多模光纤、多芯光纤、少模光纤技术进展和应用前景。

YOFC Won Many Awards in 2016 Chinese Communications Annual Conference

□ Zhang Fanghai from Strategic Center

On December 27, 2016 Chinese Communications Annual Conference & the 11th Chinese Communications Industry Technology Annual Conference was held in Beijing. The conference announced “the Ten Events in Chinese Communications Industry in 2016”, “the Ten Technology Trends in Communications Industry in 2017” and “the Jin Zizhu Award in Communications Industry in 2016”.

YOFC won several awards in this conference: “the Leading Enterprise in Chinese Communications Industry in 2016”, “the Excellent Product in Chinese Communications Industry in 2016” by the ultra-low attenuation large effective area optical fiber (FarBand®Ultra) and “the Technical Figure in Chinese Communications Industry in 2016”by Ruichun Wang, the manager of research and development center of YOFC.

The theme of this reference was “The Opportunities and Challenges in The Big Connection”. The well-known experts in the industry, operators and big shots in enterprise technology were invited to the conference and they gave sixteen keynote

speeches in the field of 5G, network reconstruction and optical networks. Zhang Fanghai, the senior expert in YOFC gave a speech entitled as “The New Type of Optical Fiber Technology Promotes the Revolution of Big Connection” in the conference, mainly introducing the technical progress and application prospect of the G.654 ultra-low attenuation large effective area optical fiber, the broadband OM5 multimode fiber, multicore fiber and few-mode fiber.

400G研究如火如荼 2017年将迎来关键进展

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基于100G的OTN/WDM技术自2013年起已在运营商网络规模商用，成为干线网和城域网的主流速率。随着“宽带中国”战略的持续深入，移动互联网、高清视频等新兴业务持续爆炸性的增长，运营商网络的传输带宽需求呈不断上升趋势，这对于400G等超100G技术和产业发展起到了明显的推动作用。

经过数年发展，400G技术将在2017年迎来新的发展态势，下面从技术标准、产业推进、应用需求、关键技术等方面进行分析。

400G 国际、国内标准逐步成熟

400G相关国际标准主要在ITU-T、IEEE和OIF三大国际标准组织进行，ITU-T主要对于400G物理层和400G OTN开展标准化；IEEE主要规范400GE和200GE等客户侧接口；OIF针对互联互通和有关光电接口和接收机等展开研究。

IEEE802.3主要开展客户侧接口400GE（802.3bs）的标准化工作，并与后来增加的200GE接口同时进行研究。该项目于2014年3月正式立项，在标准讨论过程中关于单模光纤的具体光接口技术方案和FEC选择等争议较大，导致整个标准化进程滞后于初始计划，但经过产业界各方的共同努力，草案D1.0于2015年9月推出，目前已经进入草案D3.0的征求意见阶段，预计在2017年底能够正式发布标准，具体的标准制定时间计划表见图1。

ITU-T SG15的Q6和Q11分别负责超100G物理层和光传送网（OTN）逻辑层的标准化工作，其中Q6主要把超100G应用的新型物理传输技术纳入到G.sup39文件之中，但对于超100G的具体物理传输参数的标准化工作尚未开展；Q11主要研究超100Gbit/s OTN的标准化工作，与超100G（包括400G）有关的OTN逻辑结构在2016年3月正式通过的G.709的修订版中已经体现。另外，随着IEEE 802.3有关标准的逐步推进，与其相关的映射方式等也将在Q11进一步明确。

OIF（光互联论坛）的物理链层（PLL）工作组主要负责光电模块及高速接口等标准化工作，2015年已经发布了“400G应用有关的技术选择”白皮书，同时也在2016年底立项多个与400G速率相关的项目，其中最典型的包括传输距离为120km（ZR）的光接口标准化项目（400ZR Interop，oif2016.400.04），计

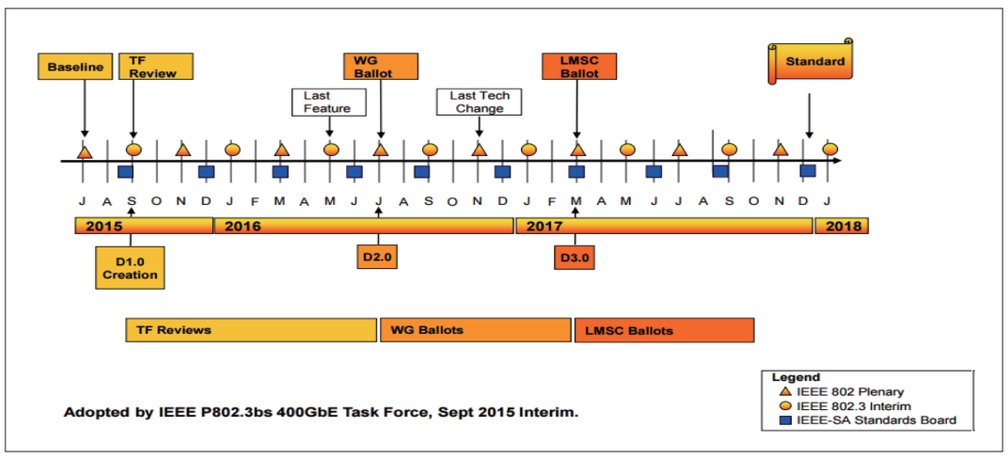


图 1 IEEE 802.3bs 标准制定时间计划表

划2018年第三季度完成，以及在FlexE接口中增加200GE和400GE速率的项目（FlexE2.0，oif2016.361.01）等，计划在2017年年底完成。另外，OIF目前同时尚有CEI-112G、CEI-56G、灵活相干DWDM传输框架、高带宽相干调制功能、高带宽集成相干接收机、CFP2-DCO、CFP8-ACO等方面的研究。

国内中国通信标准化协会CCSA TC6的WG1和WG4开展400Gbit/s的标准化研究工作，与国际基本同步，已经在2016年立项了多个与400G系统和器件有关的技术要求和测试方法，预计在2017年将加快研究和标准制定进程。

综上来看，400G有关的国际标准将逐步在2017年成熟完善，国内与系统设备直接相关的标准也已经进入标准研究阶段，随着有关标准的成熟推出，将为后续400G产业发展起到较大的推动作用。

400G 的研究试点方兴未艾

国内三大运营商非常关注400G技术的发展和测试评估，中国移动在2014年率先启动400G多设备厂家和多光纤类型实验室测试，验证了4x100G-QPSK(@125/150GHz)和2x200G-16QAM(@75/100GHz)两种技术方案，在现网完成了西安-郑州-信阳两种光纤的现网测试，结果表明当时的16QAM技术难以满足省际干线传输需要。

2015～2016年期间中国移动始终关注400G技术的进一步发展，同时也对部分新研制的超100G模块结合ROADM技术进行了初步验证，预计2017年对于400G技术和性能将进一步开展测试验证。

中国电信2014年下半年完成400G技术实验室测试，对传输能力、系统余量、传输代价等指标进行验证，并在近两年持续关注400G技术最新发展。

而中国联通从2016年在山东和新疆的一级和二级干线启动新型光纤和400G现网试点验证工作，以评估系统的传输性能和环境适应性。在试点过程中将普通光纤和G.654光纤混合组缆，以评估新型光纤的实用性能，其中山东段是管道光缆，长400多公里，新疆段是架空光缆，长140公里。2016年末到2017上半年，中国联通将开展400G光系统的测试评估工作。从目前的技术与发展和商用产品验证来看，400G将成为高速传输领域新热点，原型设备形式多样，测试和试点应用广泛开展，

400G 应用需求逐步明晰

从目前的需求现状来看，400Gbit/s技术的传输需求主要来自以下几个方面：一是IP骨干网和干线光传送网大容量传送，根据相关预测，未来我国运营商干线网流量的年增长率依然会高达40%左右。到2020年核心骨干网带宽需求将可能达到2011年的20～25倍，链路容量可能达到100T，节点容量有可能超过400T。二是数据中心互联，目前比较大的数据中心出口带宽可达到一百至几百Gbit/s以上，每年还以50%以上的速度在增长，2015年已经开始出现单波长400Gbit/s需求，2020年预计出现1Tbit/s需求。随着云计算的发展，使得不同数据中心之间的物理界限日益模糊，数据中心互联的带宽需求将进一步提升。而行业专网如现代科学计算高速数据网络、金融网络金融系统网络的带宽需求也在逐年增加，都在推动传输容量的进一步提升。

目前国内外主流厂商如华为、中兴、烽火和诺基亚等均发布了其400Gbit/s样机，其他厂家也在积极开发当中，从了解到的信息来看，目前400Gbit/s传输大多采用多波长复用的方案（即2个200G波长拼凑成400G，或4个100G拼成一个400G），单纤传输容量可以从当前的C波段8T提升到12.8T（采用4×100G方案）或者21.3T（采用2×200G方案）。

对运营商省际、省内骨干网而言，由于存在1000km以上的超长距离传输需求，4×100G方案能够实现但需要现有系统支持灵活间隔。2×200G则必须结合低损耗或超低损耗光纤以及新型低噪声光放大器、采用降低频谱效率的方式等才

可能实现。

城域网、数据中心等的大带宽互联可能率先采用400G，2×200G或4×100G都可达到传输容量和传输距离的一般需求。对于小容量的汇聚场景，光子集成（PIC）可能是更具竞争力的解决方案。

解决方案多样化 需按需选择

相对于100G技术，400G无论在客户侧还是在线路侧均将发生显著变化。对于客户侧而言，经过近3年的研究和标准化推进，400GE在逻辑和物理接口结构、传输距离、调制格式、单通道波特率等关键参数已达成共识并已写入IEEE 802.3bs标准。

就技术本质而言，400G线路侧接口技术面临的主要问题是传输距离和频谱效率的平衡问题。在技术方案方面，是引入多子载波的概念将单独光域载波的传输速率降低；二是采用更高阶的调制降低实际信号的波特率，譬如引入16-QAM；三是引入特定的复用技术降低传输损伤或者波特率等，譬如基于奈奎斯特的子载波复用技术、基于光域或者电域的正交频分复用（OFDM）技术等。从目前400Gbit/s业界普遍采用的技术方案来看，基于QPSK调制并采用奈奎斯特滤波的4载波方案、基于16QAM/8QAM/QPSK调制的2载波方案是目前典型的实现方案，同时也有一些短距离传输的基于n-QAM单载波实现方案（譬如OIF的400ZR Interop项目），而实现较为复杂的OFDM技术应用到400Gbit/s线路侧接口的可能性很低，或许在未来超400Gbit/s技术将可能采用。从目前测试验证和公开报道的结果来看，基于QPSK调制并采用奈奎斯特滤波的4载波方案的传输性能与现有的100Gbit/s性能接近，但频谱效率提升力度不够，仅提升1.6倍（达到3.2bit/s/Hz）左右，相对于100G技术在集成度和成本方面优势不大，预计实际网络中应用的可能性较低，而基于2载波的400Gbit/s技术将是城域和干线后续应用的主流技术，但由于不同调制格式支持的传输能力不同（譬如16QAM传输距离为600km量级，8QAM为800km量级，QPSK大于1000km），需要根据实际传输距离、性能和系统成本等需求择优选择。因此，现有的400G线路侧技术方案没有一种同时兼顾传输距离和频谱效率的最优化，只能根据实际传输需求选择适合的技术方案，同时结合灵活栅格和ROADM等技术实现灵活组网，但这也不排除后续发展过程中其他更优势方案的推出。

对芯片、器件和光纤等将提出新要求

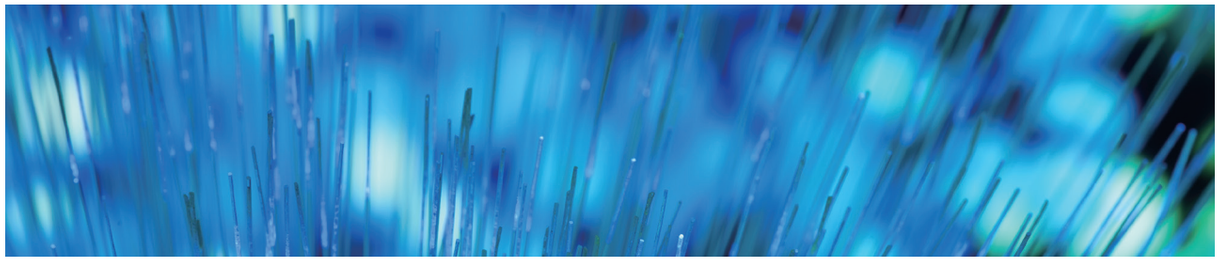
400G技术的技术研究和逐步试点应用将对于高速传输技术产业链的持续完善和发展起到推动作用，对于器件和光纤介质方面都会有不同程度的影响和推动。

首先，400G长距离传输目前的主流技术预计将沿用100G器件的工作速率，这将进一步延长100G相关核心器件的生命周期。

其次，为了支持400GE客户接口和400G线路接口的新型调制码型等，新型支持更高速率的电域和光域芯片、器件、模块和传输设备将不断研制和推出。

再次，为更进一步增加400G线路的传输距离，一些更低损耗和更大有效面积的新型光纤、更低噪声的光放大器等将可能会逐步引入和部署。

最后，400G相关产品的应用将与



400G线路技术将重用100G成功应用的偏振复用、基于相干的数字信号处理、相位调制等技术理念，但在具体应用时将面临两个主要制约因素：一是由于速率相对于100Gbit/s提升了4倍，如果采用完全相同的技术，那么对于光电器件的带宽响应也要提升4倍，显然目前的器件无法满足；二是传输性能问题，速率提升后接口对于光信噪比的要求显著增高，这就意味着传输距离将会明显缩短。因此，400G技术选择不仅仅是简单的100G技术方案拷贝，而是要结合400G实现的限制因素后综合选择。

对于400G速率面临的以上两个问题，目前业界主要从多方面探索解决，一是传输载波不再限制于单个载波，而OTN/ROADM、SDN等技术的结合更加紧密，进一步扩展高速传输技术的应用模式，同时为未来更高速率传输技术的技术研究和产业化推广奠定基础。总之，400G技术未来将逐步推动元器件、模块、设备、新型光纤、应用部署等相关高速传输产业链多个环节的进一步发展和革新。

400G技术经过多年的发展，在技术、标准、产业等方面都取得了不少进展，2017年随着技术标准的逐步成熟，相信在关键技术和产业等方面也会逐步取得更大进展，400G技术同时也对于芯片、器件以及光纤介质等有一些新的要求和影响，需要产业界各方共同努力推动400G技术和产业的发展。

Research of 400G Technology Grows Vigorously and Crucial Progress Will Be Made in 2017

☐ China Academy of Information and Communications Technology
Zhang Haiyi, Zhao Wenyu

OTN/WDM technology based on 100G has been used in the operator's commercial network scale since 2013, which has become the mainstream rate of trunk network and MAN. With sustained development of "Broadband China" strategy, the new rising business such as mobile internet and high definition video increases explosively and continually. Meanwhile, transmission bandwidth demand of the operator's network is increasing constantly. As a result, it promotes ultra 100G technology including 400G and industrial development obviously.

400G technology will usher in new development trend in 2017 after several years' development. We carry out analysis in terms of technical standard, industry promotion, application requirements and key technology.

International and domestic standards of 400G technology have become mature step by step

Relevant international standards of 400G technology are mainly carried out in three international standard organizations including ITU-T, IEEE and OIF. ITU-T is mainly used for carrying out standardization of 400G physical layer and 400G OTN; IEEE is mainly used for standardizing 400GE and 200GE client side interface; OIF is used for study of interconnection and related optic electric interface and receiver.

IEEE802.3 is mainly used for carrying out standardization of client side interface 400GE (802.3 bs). In addition, it is used for study with 200GE interface increased later at the same time. The project was established formally in March 2014. The specific optical interface technology scheme of single mode fiber and selection of FEC are more controversial during standard discussion. As a result, the whole standardization process lags behind the initial plan. However, the draft D1.0 was launched in September 2015 through joint efforts of all parties of industrial circle. At present, the draft D3.0 is in the stage of soliciting opinions. It is predicted the standard will be issued officially at the end of 2017. Refer to Figure 1 for the specific standard formulation schedule.

Q6 and Q11 of ITU-TSG15 are responsible for standardization of ultra 100G physical layer and logic layer of OTN respectively. Q6 is mainly used for bringing ultra 100G applied new physical transmission technology into G.sup39 file. However, the standardization of specific physical transmission parameters of ultra 100G has not yet been carried out; Q11 is mainly used for studying standardization of ultra 100Gbit/s OTN. The logical structure of OTN related to ultra 100G (including 400G) was reflected in G.709 revised edition approved in March 2016 officially. In addition, as IEEE 802.3 relevant standard is promoted gradually, related mapping mode will be further defined in Q11.

PLL (Physical Link Layer) working team of OIF (Optical Internetworking Forum) is mainly responsible for standardization of optical-electric module and high-speed interface. The white paper of "400G Application Related Technology Selection" was issued

in 2015. Meanwhile, many projects related to 400G rate were established at the end of 2016. The most typical projects include optical interface standardization project with 120km (ZR) of transmission distance (400ZR Interop, oif2016.400.04), which will be completed in the third quarter of 2018 according to the plan and the project of increasing 200GE and 400GE rate to FlexE interface (FlexE2.0 , oif2016.361.01), which will be completed at the end of 2017. In addition, OIF has carried out research in CEI-112G, CEI-56G, flexible coherent DWDM transmission framework, high bandwidth coherent modulation function, high bandwidth integration coherent receiver, CFP2-DCO and CFP8-ACO.

WG1 and WG4 of CCSA TC6 carry out 400Gbit/s standardization study which are basically synchronous with international study. Many technical requirements and test methods related to 400G system and device were established in 2016. It is predicted study and standard formulation process will be accelerated in 2017.

All in all, 400G related international standard will be perfected gradually in 2017. Domestic standard directly related to system equipment has been in standard research stage. With mature launch of relevant standard, it will promote subsequent 400G industrial development greatly.

Pilot of 400G technology is in the ascendant

China's three telecom operators are very concerned about the development, test and evaluation of 400G technology. In 2014, China Mobile launched pioneering laboratory tests of 400G technology in multiple types of optic fibers with multiple device manufacturers , which proved the correctness of such two technical plans as 4x100G-QPSK(@125/150GHz) and 2x200G-16QAM(@75/100GHz). The result of the present network trial of those two optic fibers from Xi'an to Zhengzhou to Xinyang showed that 16QAM technology could not meet the demand of cross-province trunk transmission.

China Mobile had always been paying attention to the ongoing development of 400G technology from 2015 to 2016. At the same time, China Mobile carried out a preliminary trial of ultra-100G module and ROADM technology and will conduct more trials of the technology and performance of 400G technology in 2017 as estimated.

China Telecom finished laboratory tests of 400G technology in the second half of 2014, which verified the validity of such indicators as transmission capability, system allowance and transmission cost. China Telecom remains concerned about the latest development of 400G technology in recent two years.

Since 2016, China Unicom has been carrying out pilot present network trials of new type fibers applying to primary and secondary trunk transmission lines and of 400G technology in Shandong Province and Xinjiang Uygur Autonomous Region to test this system's transmission capability and environment compatibility. During the process of trial, the mixture of general optic fibers and G.654 optic fibers are used to test the practical function of new type fibers. For the segment in Shandong Province, duct optical cables are used, crossing the distance of more than 400 km. Aerial optical cables are used for the segment of Xinjiang Uygur Autonomous Region, crossing the distance of 140 km. From the end of 2016 to the first half of 2017, China Unicom will carry out test and evaluation work of 400G technology. On account of the current technologies, its development, and commercial products, 400G will become a new hot spot in the field of high-speed transmission. There are multiple types of prototype equipments. Trials and pilot applications are being launched extensively.

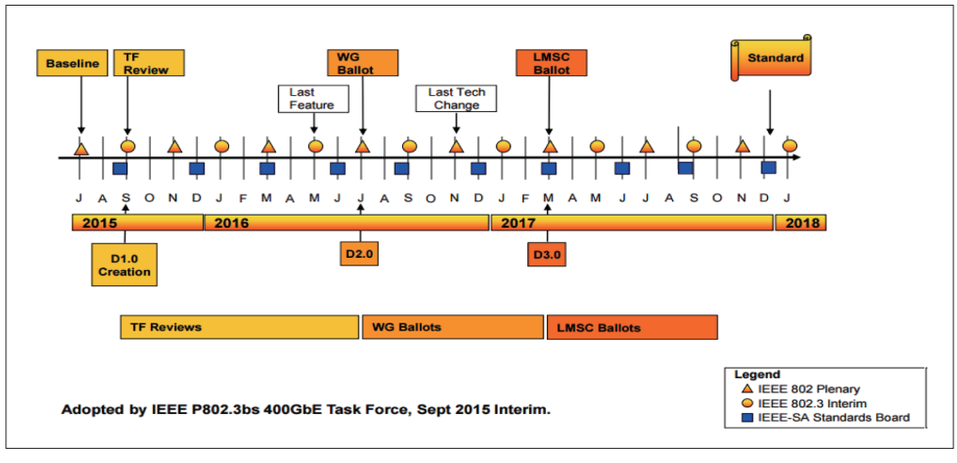


Figure 1 IEEE 802.3 bs Standard Formulation Schedule

Application requirements of 400G are gradually clear

Judging from current demand situation, the transmission demand of 400Gbit/s technology is mainly from the following aspects. Firstly, IP backbone network and trunk optical transmission network need massive transmission. According to the relevant forecast, the annual growth rate of Internet traffic of trunk transmission lines provided by China's cellularoperators is still as high as 40%. By 2020, the bandwidth demand of core backbone network will increase 20~25 times than that in 2011, link capacity will reach 100T, and node capacity may exceed 400T. Secondly, data centers are interconnected. Relatively large exit bandwidth of data center at present can reach 100~hundreds of Gbit/s, whose speed is increasing at the rate of 50% each year. In 2015, single wave of more than 400Gbit/s has appeared. The demand of single wave of more than 1Tbit/s is expected to emerge in 2020. With the development of cloud computing, physical boundaries among data center are increasingly blurring and the demand of data centers for bandwidth are increasing. The demand of dedicated industry network such as modern scientific computing high-speed data networks, financial network system for bandwidth is increasing year by year, which promote the performance of transmission capacity.

Major enterprises in China and abroad such as Huawei, ZTE, FiberHome and Nokia have currently launched their 400Gbit/s prototypes, and other enterprises are also positively engaging in development in this Þeld. Judging from the information learned, most 400Gbit/s transmission at present is using multiplex multi wavelength plan, which means that using two 200G wavelength to reach 400G, or using four 100G wavelength to reach 400G. In this way, transmission capacity of single fiber will increase from the current 8 T in C-band to 12.8 T (4 × 100G) or 21.3 T (2 × 200G).

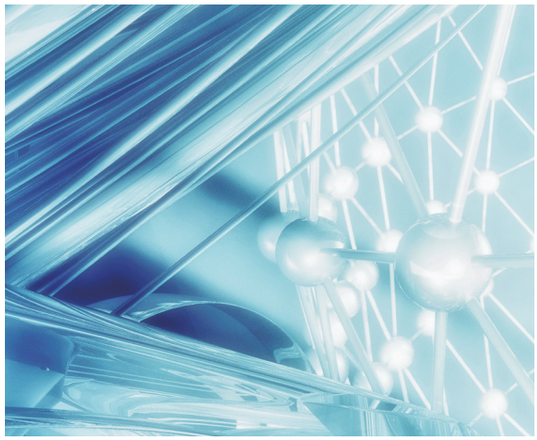
For cellular operators' backbone networks crossing provinces and within provinces, the plan of 4×100G can be available but needs existing technology support of flexible intervals due to extra-long transmission distance of more than 1,000 km. The plan of 2×200G may be available when it is combined with low-loss optical fibers, ultra-low-loss optical fibers, new optical amplifier with low noise, and the reduction of spectral efficiency.

Large Internet bandwidth of metropolitan area networks and data centers probably takes the lead in using the plan of 400G. 2 × 200G or 4 × 100G can meet the general requirements of transmission capacity and transmission distance. For convergence scenario of small capacity, photonic integrated circuit (PIC) might be a more competitive solution.

Diversified solutions should be selected as required

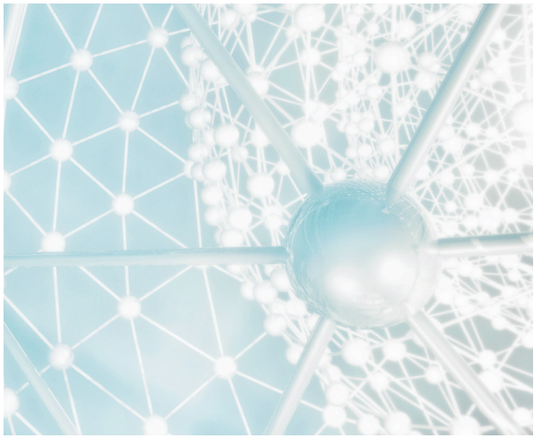
In comparison with 100G technology, 400G technology will have material changes in client side and line side. For the client side, 400GE, which is based on research and standardized promotion in recent three years, has reached a consensus in key parameters such as structure of physical and logical interfaces, transmission distance, modulation format and single-channel Baud rate and has been included in IEEE 802.3bs standard.

In terms of technological essence, 400G line-side interface technology is mainly faced with difficulty in transmission distance and balance of spectral efficiency. In respect of technical solutions, 400G line-side technology will



attach importance to such technical concepts as polarization multiplexing technology, digital signal processing based on coherent optical transmission and phase modulation in which 100G technology has been successfully applied. However, there are two major restraining factors: first of all, the rate of 100Gbit/s has been quadrupled, in the event of the same technology applied, response to the bandwidth of photoelectric devices will be quadrupled, thus, current devices may not meet this requirement; the second problem is in transmission performance, after the rate is increased, interfaces have clearly high requirements for optical signal to noise ratio, which means that transmission distance will be significantly reduced. Therefore, the selection of 400G technology is not only a simple copy of 100G technical solution, but also requires combining with restraining factors of 400G realization so as to make a comprehensive decision.

For the two problems involved in the rate of 400G, people in this industry mainly are exploring the solutions from different respects currently. Firstly, carrier transmission is no longer limited to single carrier, but multi-subcarrier concept is introduced to reduce the transmission rate of carrier in single optical domain;



additionally, higher modulation is adopted to reduce Baud rate of actual signals, e.g. introducing 16-QAM; furthermore, specific multiplexing technology is introduced to reduce transmission impairments or Baud rate, for example subcarrier multiplexing technology based on Nyquist's Theorem, orthogonal frequency division multiplexing (OFDM) technology on the basis of optical domain or electrical domain, etc. With respect to current solutions generally used in 400Gbit/s technology, the 4-carrier solution that is based on QPSK modulation and for which Nyquist filter is applied, and 2-carrier solution based on 16QAM/8QAM/QPSK modulation are typical realization solutions now. In addition, some short distance transmissions rely on n-QAM single carrier realization scheme (e.g. OIF 400ZR Interop project), while there is a little possibility to apply complex OFDM technology to 400Gbit/s line-side interface, and ultra-400Gbit/s technology may be applied in future. According to the results of tests in public reporting, the transmission performance of the 4-carrier solution, which is based on QPSK modulation and for which Nyquist filter is applied, is similar to the performance of current 100Gbit/s technology, but its improvement of spectral efficiency is not enough and spectral efficiency can be only increased by about 1.6 times (to 3.2 bit/s/Hz). In terms of integration level and cost, its advantages are not so clear in comparison with 100G technology, it is thus anticipated that the possibility of its application in real network is very low. However, 2-carrier based 400Gbit/s technology will become the mainstream technology in subsequent application in metropolitan area network and trunks. Due to different modulation formats supporting different transmission performances (e.g. 16QAM for the level of 600 km in transmission distance, 8QAM for the level of 800 km, QPSK more than 1,000 km), optimization selection should depend on such demands as actual transmission distance, performance and system costs. Hence, none of existing 400G line-side technical solutions has been optimized in both transmission distance and spectral efficiency and an appropriate technical solution may be only selected according to actual transmission requirements. At the same time, it is required to combine with such technology as flexible grid and ROADM to realize flexible networking, but this may not exclude that other solutions with more advantages appear in subsequent development.

New requirements will be put forward on chips, devices and optical fibers, etc.

Technical research and pilot application of 400G technology will push forward the sustainable improvement and development of high-speed transmission technology industrial chain and influence and promote devices and optical fiber media in varying degrees.

Firstly, the current mainstream technology of 400G long distance transmission will follow the work efficiency of 100G device, which will prolong the life cycle of 100G related core devices.

Secondly, in order to support items like the new modulation format of 400GE customer interface and 400G line interface, the new format supporting higher rates of chips, devices, modules and transmission equipment in electric domain and optical domain will be developed and introduced gradually.

Thirdly, in order to increase the transmission distance of 400G line further, some new kinds of optical fibers with lower loss and larger effective area, lower noise optical amplifiers and others may be introduced and deployed step by step.

Finally, the application of 400G related products will be closely combined with the technology such as OTN/ROADM and SDN, extend the application pattern of high-speed transmission technology further and lay a foundation for the technical research and industrialized introduction of higher speed transmission technology in future. In a word, 400G technology will promote the further development and revolution in multiple parts of related high-speed transmission industrial chain such as devices, modules, equipment, new optical fibers and application deployment.

400G technology has made great progress in such fields as technology, standard and industry after years of efforts. With relevant technical standards getting mature in 2017, we are confident that more advances will be made in key technologies and industry. In addition, 400G technology has some new requirements and influences on chips, devices and optical fiber media, therefore, all the parties of industry are required to make joint efforts to promote development in 400G technology and industry.

如何利用资源达到目标效果

□ 销售中心 李立宾

编者按：

“曹冲称象”可谓是家喻户晓的故事，故事体现出曹冲的聪明，但这聪明不是与生俱来的，而是平时细心观察事物、分析事物本质，发现事物之间的关系，对事物进行整合利用、善于利用身边资源所得。

上篇：如何充分利用身边资源

进入现代社会，资源的概念变得更加广义，除了自然资源还有社会资源、人力资源、信息资源，具体到一个行业一个公司一个部门一个团队，又衍生出行业资源、公司资源、部门资源、团队资源等。众多资源就在我们身边，资源是财富，懂得利用身边资源的人往往事半功倍，反之则孤军奋战、行事艰难。

如何才能充分利用身边资源？首先，**要树立资源意识**，我们做任何事都要考虑自身条件与客观条件。如果我们在做事情之前往往只考虑自身条件，而忽视了那些可以利用的外部条件，没有充分利用外部资源，将导致许多事情不敢去做，或做了也不成功。在现实社会中，有些事情自己是可以完成的，而一些事情靠自身单枪匹马、孤军奋战是无法完成的。因此，我们必须树立强烈的资源意识，把资源看作是我们成功的基本条件，要有开放的眼光，寻找、整合、利用资源。

其次，**要善于发现资源**。有了资源意识只是先决条件，还要善于发现资源。在你做一件事之前，要考虑周边的人和事哪些是有利条件，哪些是不利条件，对有利条件充分利用，对不利条件加以规避。在有利条件中哪些是主要的，哪些是次要的，它们之间是什么关系，如何采取抓重点带一般的策略；在不利条件中哪些是主要的，哪些是次要的，内在关系怎样；如何通过规避主要因素而破解一般的不利因素，这就需要我们辩证地发现问题，从而决定行动策略。

再次，**要善于利用资源**。在我们利用的资源当中，一方面是客观的物质资源，另一方面是人的资源。这里主要讲人的资源，如何利用好人的资源是一门科学也是一门艺术，原则就在你让别人帮助你时不但享受到快乐，还会让他们得到他们想要的东西，清楚对方的心理和需求，从而实现双赢。

最后，**就是对资源的整合**。对待有利的资源加以利用，对不利的因素巧妙规避，或者把不利的条件转化为有利的条件。在实践中，要时刻注意条件的变化，一些有利的条件和不利的条件在某些情况下是可以互相转换的。另外，随着时间的发展，会出现一些新的资源，不能一成不变地看问题，要用发展的眼光发现、整合、利用资源。

下篇：如何利用资源做好 OEM 督导工作

如今的社会是资源的社会，日常的工作学习需要学会利用资源，想要成功、想要突破，埋头苦干固然重要，利用好外部资源也同样重要。

具体到自身的OEM督导工作，我们想要达到的效果就是让OEM厂按照总部下达的标准及订单保质保量地完成OEM加工任务。但每个OEM厂自身实力、背景、条件不尽相同，对待总部要求的态度也各不相同，在当前光缆制造行业竞争越来越激烈的情况下，他们考虑更多的是公司如何赚取更多的盈利，对待OEM产品的质量标准有偏差甚至有抵触，这都是我们督导工作所要面对和解决的问题，那我们如何利用身边资源去解决问题?

我们不妨先静下心想想我们身边有哪些可以利用的资源：

- 总部资源——包括主管部门资源、领导资源、协管部门资源；
- 团队资源——OEM督导组、售后组的团队力量；
- OEM厂的内部资源——包括公司能用到的一切有利条件，主要是人的资源，这需要督导自身去摸索去发掘。

以上资源相辅相成，如何将其充分地整合利用变成我们督导强大的武器，这需要我们不断地探究与学习。

OEM督导需要练好四大基本功

督导做为“极限单兵”面对一个OEM厂，如何利用好以上资源，个人认为要做到以下四点：

首先，所谓知己知彼百战不殆，要

尽可能对其充分了解。要与中高层管理者建立良好的沟通，了解其对待OEM生产的思路，从而在面对具体问题、开展自身工作时，能够遵循管理者的思路；更要扎根基层，积极了解一线员工的反馈和想法，毕竟他们才是最了解生产的人，发挥好群众资源的能量，更多地发现问题。

其次，要善于利用各部门的职能作用，充分利用其相互之间的协同作用，结合OEM厂的实际情况，对于具体的工作安排可指定责任人或部门，可以达到事半功倍的效果。

再次，遇到重大事件或棘手问题，尽量避免“一刀切”或“针尖对麦芒”的方式，要善于分析问题转化矛盾，将问题提到更高的层面，让OEM厂自行提出解决思路和方案，必要时加以引导帮助，在后期的执行力度上会有截然不同的效果。

最后，对那些屡教不改、公然无视质量原则的行为，在上述手段都失效的情况下，那就要综合考虑问题，必要时借助总部及团队的力量解决。

案例分享

下面举几个笔者在工作中的实例来分析。

1.护套排线问题，每个光缆厂或多或少都会存在，检查排线质量单靠督导一人力量难以实现，可将此责任指定给最终检测部，出现问题追究检测部责任，充分调动其职能特性，严格要求护套收线人员，从而提高排线质量。

2.笔者初到某OEM厂督造期间，发现了诸多问题，主要集中在设备、光缆渗水、违规操作等方面，其严重性直接威胁到光缆质量。督导现场反馈问题推动整改，虽有改进但迫于资金压力及思想观念等方面因素，实际效果并不理想。在如实汇报总部后，总部领导及时做出英明决断，对该OEM厂光缆进行停产整顿。此举对此OEM厂光缆震动很大，使得此OEM厂高管做出决策，投入人力物力积极配合整改，尤其在光缆渗水方面积极听取现场督导建议，极大地提高了光缆渗水性能。此次整改对各个OEM光缆厂也起到“敲山震虎”的作用，对后期督导工作的开展有着深远意义。

3.其中一家OEM厂盘具包装问题一直较为突出，了解情况后总结问题根源在于8号盘具厂。此OEM厂现有3家盘具厂，8号盘具厂在其中占比份额最大（70%左右），且与长飞某光缆公司有着复杂的关系，这也是长飞光缆某公司自建厂以来盘具成为老大难问题，经过数次整改也未见明显效果的根本原因。谁是甲方、谁是乙方、谁为谁服务关系颠倒，以前8号盘具厂曾多次无视盘具加工规范，擅自更改盘具标准甚至搞“发明创造”进行偷工减料。

对于上述情况进行分析后，借鉴前面的整改经验，常规手段已经不能起到根本的作用，唯有剔除或降低份额才能根本改变现状。在与长飞某光缆公司高管及相关部门充分沟通后最终决定降低份额（由70%降低为30%），并借助长飞质保部的资源对其实行减量整改，此OEM厂内部做到严格控制份额。从2016年3月20日执行至今，整体盘具包装质量有了明显改观。这期间一直鼓励9号盘具厂做得更好，增大其份额，形成模范带头作用，迫使8号盘改变态度跟上形式，起码能做到按标准生产，不敢再偷工减料。3家盘具厂都很重视自己的份额，已明确告知他们今后盘具份额的多少以盘具质量作为唯一衡量标准，以份额控制质量、引入竞争，这对今后盘具工作起到了很好的控制作用。

OEM督导在实际工作中遇到的问题千变万化，需要我们开动脑筋策略性地对待，发现问题是根本，如何利用身边资源解决问题才是重点。这要求我们督导不断地摸索和学习，提高自身修为，努力到达预定的目标及效果。

How to Achieve the Goal by Utilizing Resources

□ Li Libin from Sales Center

Abstract:

The story of Cao Chong Weighs the Elephant has been known to many households. It depicts a clever young boy. However, man is not always born with cleverness. It is an outcome of daily careful observations and analysis of the nature of things to discover the relation among them, and further consolidation and utilization of resources around.

Part I: How to make full use of resources around

The notion of resource in modern society has widely been extended. In addition to natural resource, there are social, human and information resource. When it specifically comes to an industry, a company, a department and a team, it can derive more resources, such as industrial resource, corporate resource, departmental resource, team resource etc. We are surrounded by various resources, which are great fortunate. Those who knows the way to fully utilize resources around will yield twice the result with half the effort; while those who don't will find them fight a hard way alone with little paid off.

How do we take full advantage of resources around us? Firstly, we should be equipped with the awareness of resource. Anything we are engaged in should be considered based on our own conditions and real-world situations. If we think about our own conditions only before we do anything, but neglect and fail to make full use of those external advantages that we can rely on, then we will dare not try or be unable to accomplish many things. In the real-world scenario, we may play solo, but we will find it impossible to be always invincible without the support of other resources. Therefore, we must be well aware of the importance of resources, and consider resource as the cornerstone of success. We should seek, consolidate and utilize resources with open eyes.

Secondly, we should be adept in discovering resources. The awareness of resources is just a pre-requisite, the ability to discover resource is the key. Before you opt for something, you should think about the advantages and disadvantages around you, and make full use of favorable factors and avoid those unfavorable conditions. You should also have a keen eye of telling the major advantages from the minor ones, and understand their relationship so that you can stress the essentials. It is the same case with disadvantages, so that you can get rid of general unfavorable factors by shunning from the major ones. This requires us to spot the problems in a dialectical manner before jumping into any actions and strategies.

Thirdly, we should be able to utilize resources in a proper way. Resources can be classified into material and human. As for the latter, utilization of human resources

can be a science and an art as well. The principle is that you are going to let others be happy when they offer help. Also, they will get what they desire. If you are clear about the mind and need of them, you will achieve a win-win situation.

Finally, consolidation of resources. You should make good use of favorable resources and avoid unfavorable elements, or turn unfavorable to the opposite. In practice, you should constantly keep an eye on the changes of conditions. Some favorable conditions and unfavorable ones may change into each other given certain circumstances. In addition, as time goes by, new resources will emerge. Therefore, you should not see things as what they were before. You should discover, consolidate and utilize resources from a developing and changing perspective.

Part II: How to make use of resources for better OEM supervision

The nowadays society is resource-based. No matter in daily life or at work, you should know how to make use of resources. It is important that you work hard to make breakthroughs and aim for success. However, better utilization of external resources can be of the same importance.

Specifically speaking, when it comes to OEM supervision, what we want to achieve is that OEM plants will accomplish OEM processing tasks based on quality and quantity standards and requirements by the headquarters. The fact is that, however, each OEM plant is different from another in terms of their respective strengths, backgrounds and conditions, and they will quota different attitudes toward requirements of the headquarters. Given the more and more sizzling competitions amid the fiber optic cable manufacturing industry, the plants will give more weight to the way of making more profits. As a result, they may have a different and even opposite view about the quality of OEM product. These are the problems that our supervision team should be facing and addressing. Thus, how do we make use of resources around to solve these problems?

We can calm down first and think about what resources around us can be of full use:

- The headquarters resources—including resources of competent departments, resources of leaders, resources of departments offering assistance;
- Team resource—the power of OEM supervision team and after-sales team;
- Internal resources of OEM plant—including all favorable conditions that the company may find useful, mainly human resources. This requires the supervision team to explore and discover on their own.

The above resources complement each other. We should keep studying and learning before we understand how to make full use of them and make them a powerful weapon for supervision.

Four fundamental principles for OEM supervision

A supervisor, as an "ultimate individual" facing an entire OEM plant, should understand the following four fundamental principles of making good use of resources mentioned above:

Firstly, as an old saying goes, "Know the enemy and know yourself and you can fight a hundred battles with no danger of defeat", you should obtain information as much as possible. You should keep in sound touch with medium and senior level management and understand their ideas about OEM production, so that you will be able to grasp the management's thinking pattern when it comes to specific problem or task. You should further take root in the grass-roots level, and know what first-hand workers and operators are thinking, for they best understand the production. Make full use of the energy of people and discover more problems.

Secondly, we should be adept to make full use of the functionality of each department, and the synergy between each of them. Given the actual situations of OEM plant, we can appoint someone or certain department to be responsible for specific tasks and achieve a better effect with less effort.

Thirdly, when facing major events or problematic issues, we should try the best to avoid "one size fits all" or "head-to-head" approaches. We should analyze the problem and transform conflicts. We should view the problem from a macro perspective, and allow the OEM plant to put forward ideas and solutions to the problem by themselves. We can provide guidance when necessary. This will bring distinct results to the adequate implementation in latter period.

Finally, for those incorrigible behaviors and defiance against the principle of quality, we should give comprehensive and overall consideration to the problem when all the above-mentioned methods fail, and rely on the power of the headquarters and the team to fix it when necessary.

Case study

The following contains real-world cases at work:

1. Jacket wiring displacement problems can somehow be found in each fiber optic cable plant. It is quite impossible for one supervisor alone to inspect the quality of wiring displacement. Therefore, you can delegate the task to final testing department and call the department to account when problems emerge. This will fully activate the department's functionality so that they will make higher requirement for operators and thus improve the quality of wiring displacement.

2. When I conducted supervision in an OEM plant for the first time, I spotted a number of problems, which mainly lied in water seepage of equipment and cable, as well as violation operation. They were serious enough to jeopardize the quality of fiber optic cables. I reported the problems at supervision site and promoted rectification and changes. There were some improvements, however, the actual results were not satisfactory due to fund shortage and employee mindset. I further reported the actual situations to the headquarters, which made timely and wise decision to call the OEM plant to halt production for thorough rectification. The move was an earthquake in the OEM plant, driving the plant executives to invest human and material resources for the rectification. In particular, they listened advice of supervisor on water seepage of optical cable, and greatly improved the performance of water resistance of cables. The rectification also sounded a warning to each OEM cable plant, which is of profound significance to supervision task in the future.

3. One OEM plant has a prominent problem of drum package. We found that the problem was rooted in No. 8 drum factory. The OEM plant has three drum factories, and No. 8 factory has the biggest quotas (around 70%) and complicated relation with a cable company of YOFC. This is also the reason why the cable company has become a hard nut to crack since its establishment. Even going through multiple rectifications, it has seen little improvement. This shows an "upside-down" understanding of the employer and the contractor. No. 9 drum factory has even ignored drum processing specifications and altered the standards without consent to cheat on workmanship and materials.

After an analysis of the above situations and previous rectification experience, we can find that regular methods will not work here. The only solution will be removal or reduction of quotas. Then after full communication with senior management of the factory, a final decision to reduce its quotas from 70% to 30% was made. In addition, with support from YOFC quality assurance department, we have brought in rectification to the factory while the OEM plant has introduced strict control of quotas. Since the implementation on March 20, 2016, the rectification has greatly improved the overall quality of drum package. During this period, we also encouraged No. 9 drum factory to do better and gave it more quotas and set it as an example, forcing No. 8 drum factory to catch up to the standards and stop cheating. The three drum factories all attached great importance to their quotas, and they have been informed that the only criterion for evaluating the quotas is the quality of drums. Therefore, with quality assurance based on the respective quotas and mutual competition, we have introduced sound control over drum productions in the future.

OEM supervisor may come across varied problems at work. It requires us to take on tactful strategy to deal with them. It is fundamental that we find the source of problems and it is a key focus to solve the problem utilizing resources around. It requires supervisors to constantly study and explore and improve themselves to achieve the targeted objective and results.

纤云凤舞，一缆全球

——长飞公司2017年春节联欢晚会圆满成功

□ 战略中心 曾云飞

猴跃已叫千户乐，凤鸣又报万户春。2017年1月23日，湖北剧院演播厅灯光璀璨，长飞公司“纤云凤舞，一缆全球——2017年春节联欢晚会”在此精彩上演，给新年春节送上了一道丰盛的文化盛宴。

浓缩长飞人2016年工作与生活的微电影为晚会拉开了序幕，责任、传承、合作、梦想、开拓，五个词语串联出长飞人2016年的点点滴滴，也引起观众的共鸣。随着开场舞《丹凤朝阳》登场，唯美的音乐瞬间弥漫整个舞台。

接下来，公司工会和团委共同推荐第四届长飞好声音学员团队的《逐梦长飞路》用青春与朝气为观众带来了逐梦长飞的豪情万丈；销售中心的《光阴的故事年代秀》复古风劲吹，赢得了台下观众的阵阵喝彩；制造中心的相声《喝酒那些事》讲述了“喝酒不开车，开车不喝酒”的基本准则，嬉笑言谈间发人深思；集团分、子公司的歌舞《黄鹤楼》更是为观众带来独具特色的楚风汉韵。

演出高潮来自于战略中心的舞台剧《渔小鱼》，小孩子们学着渔夫的样子捕捉着小鱼儿，将“授人以鱼

不如授人以渔”的典故表现得淋漓尽致，一张张天真无邪的笑脸更展现出长飞公司的朝气与活力。“长飞质量万里行——重走信息天路”纪录片播放的同时，著名歌手巴桑朗杰演唱了两首藏族歌曲，将在场观众带到了那个令人神往的“天堂”。有歌曲、有相声当然也少不了劲舞，财务中心的歌舞《PPAP》带给观众强烈的视觉和听觉刺激。唯美的舞蹈、飘逸的裙摆、令人捧腹的相声、空灵的歌声汇成了欢乐的舞台，台下不时掌声雷动。最后，晚会在气势恢宏的舞蹈《茉莉花》中圆满落幕。

长弄纤云凤舞九天，飞驰通联一缆四海。回首2016，全球经济亟待注入增长新动能，各主要经济体都在加快信息产业布局，利用新一代信息技术与传统产业相结合塑造新的核心竞争力。“网络强国”、“中国制造2025”、“宽带中国”三大国家战略互相辉映，照亮了中国信息消费蓬勃兴起、信息经济高速发展的道路，光纤光缆行业也迎来了新的机遇和发展。

展望2017，长飞公司将继续专注技术研发，积极开拓海外市场，携手产业链各方，打造行业发展生态圈，推动全球线缆事业以及信息技术的繁荣与发展。

今夜无眠，难忘今宵，期待明年再相聚！

Phoenix Dance, Global Feast —2017 Spring Festival Gala of YOFC Were Successfully Held

☐ Zeng Yunfei from Strategic Center

The old year passed while the new year is coming. On January 23, 2017, as a cultural feast to the spring festival, "Phoenix Dance, Global Feast — 2017 Spring Festival Gala" of YOFC staged in the studio of Hubei Theater.

The gala kicked off with a micro film which reflects the work and life of YOFC men in 2016. Responsibility, inheritance, cooperation, dream, development are reflected throughout bits and pieces of 2016, which arouses the resonance of the audience. With the opening dance "Red Phoenix in Morning Sun", beautiful music filled the whole stage.

Recommended by the labor union and the Youth League Committee, "Pursuing Dreams in YOFC" by the contestants in the fourth Voice of YOFC showed vitality, youth and passion to chase dreams in YOFC. "The Generation Show" by sales center won the applause of the audience because of its vintage style. "Something about Drinking", the cross talk by manufacturing center told the basic criterion that people "shouldn't drive after drinking" and prompted us to deep thought. "Yellow Crane Tower" by branches and subsidiaries brought distinctive song and dance to the audience.

The stage play "Fishing" by strategy center brought the gala to

a climax. In the play, little children imitated the fishermen to fish, which conveyed the allusion "It's better to teach a man fishing than to give him fish" incisively. Their smiling faces also revealed the vigor and vitality of YOFC. While broadcasting the documentary " Road to Quality Excellence– Retrace the Information Road", the famous singer Basang Langjie sang two Tibetan songs, bringing audience to the fascinating "paradise". Besides songs, cross talks, there were also dances. The dance "PPAP" by financial center brought the audience a strong visual and auditory enjoyment. Beautiful dances, elegant skirts, hilarious cross talks and pure voices received thunderous applause. Finally, the gala came to an end with a magnificent dance "Jasmine".

Now the optical fiber and cable industry develops rapidly. Looking back to 2016, new strength is needed to foster global economy. Major economies all accelerate the layout of the information industry and shape new core competitiveness by combining new generation of information technology and traditional industries. Internet power strategy, Made in China 2025 and Broadband China interrelate with each other to blaze a trail for booming information consumption and the rapid development of information economy. Optical fiber and cable industry has ushered in new opportunities and developments.

Looking forward to 2017, YOFC will continue focusing on technology research and development, actively exploring overseas market, working together with companies in the industry chain to build an ecology circle of industry development and promote the prosperity and development of cable industry and information technology.

What an unforgettable night! Look forward to meet again next year!

论工匠精神

□ 长飞潜江公司　朱双杰

窗外的细雨正划过天空，发出规则的韵律，这样的天气让人心绪安宁，尤为适合思考。刚刚看完《大国工匠》的我心中不禁有所触动，望能以拙笔书写吾之所思。

工匠不是单纯的体力劳动者，在每一位工匠的技术领域中，他（她）也是一名艺术家。古人有云“技近乎艺，艺近乎道”，产品是一位工匠技艺的体现，而技艺正是工匠的道。因此，在我看来工匠精神就是对本行业技艺怀着一颗虔诚的心，对产品精益求精、不断精雕细琢，追求完美的一种人生信条。

诚然此前“中国制造”代表的只是低端的产品加工，但经过30多年的高速发展，中国制造业迎来了“中国制造”向“中国智造”的转型期，这就要求中国制造业精益求精，追求技艺的极致，即工匠精神。

从企业层面来看，每一家有民族责任感的企业都该有“民族崛起，舍我其谁”的进取精神。一家企业的根本在于产品，一家制造企业只有将重心放到对产品质量持续不断地改进上，才能助推国家的发展，在国际市场拥有竞争力。从个人角度来看，常言道“追求卓越，成功自然如影随形”，能够在平凡的岗位坚守、全力以赴地投入工作、在工作中不断地钻研学习，时间也终将给那些拥有“工匠精神”的人以回报！

怎样培养工匠精神？培养工匠精神需要企业和个人的通力协作。从企业层面来看，企业必须具备健全的人才培养机制，才能培养出拥有工匠精神的员工。一个真正的工匠可能需要十年甚至20年的积累和沉淀才能有所成就，这就要求企业在拥有长远战略意识，立志成长为百年企业的同时要兼顾员工的成长和发展。从个人层面而言，古人有云“食君之禄，忠君之事”，一个人最重要的品质就是责任、担当，要养成工匠精神，最基础的就是要做到“踏踏实实做事，问心无愧做人”。只有在平凡的岗位坚守，在日复一日的工作中持之以恒地钻研技术、积淀经验、磨砺技能，才能拥有工匠精神。

我相信，有一天，长飞人会成为工匠精神的代表！我相信，有一天，长飞公司将成为助推中国崛起的脊梁！

On the Spirit of Craftsman

☐ Zhu Shuangjie from YOFC(Qianjiang)

The rain outside the window is streaking across the sky with regular rhythm, which makes people feel peaceful and insightful. I was just touched by Great Country Craftsman and would like to express some of my thoughts.

A craftsman is not a simple physical laborer, but an artist in his domain. The ancients said, " Skills are approximate to art, while art is approximate to Tao". The products are the embodiment of a craftsman's skill, and the skill is just the Tao of the craftsman. Therefore, in my opinion, the spirit of craftsman is the faith in skills of his field and the life credo to be excelsior and to pursue perfection.

Indeed "Made in China" only represents low-end product processing before. But after more than 30 years of rapid development, China's manufacturing industry ushered in the transition from "Made in China" to "Mind in China", which requires us to strive for perfection, known as the spirit of craftsman.

From the perspective of the enterprise, every enterprise with a sense of national responsibility should have the entrepreneurial spirit to revitalize our nation. The root of an enterprise lies in the products. A manufacturing enterprise should focus on the continuous improvement of product quality in order to promote the development of the country and to have competitiveness in the international market. From an individual's perspective, as the saying goes, "Success is never far away from the pursuit of excellence". For those who possess the spirit of craftsman, which means sticking to their posts, immersing in the work and keeping on studying, the time will pay them back.

How to cultivate the spirit of craftsman? The cultivation of craftsman spirit requires the cooperation of enterprises and individuals. From the enterprise level, only with a sound talent training mechanism, can an enterprise cultivate employees with spirit of craftsman. A true craftsman may need ten years or even twenty years of accumulation and precipitation to achieve something, which requires the enterprise to have long-term strategy awareness to care about the growth and development of employees besides the determination to be a century enterprise. From the perspective of individual, as the old saying goes, " The one who takes the salary should fulþll his duty". The most important quality of a person is responsibility. So for cultivating spirit of craftsman, the most basic part is to work steadfastly and behave decently. Only when one sticks to his post, perfects his abilities, accumulates experience and hones skills persistently day after day, can he own the spirit of craftsman.

I truly believe that YOFC men will be the representative of the spirit of craftsman and YOFC will be the backbone of the rise of China in the future.

武汉行 长飞梦
——记长飞总部行

□ 长飞沈阳公司　李超

机会总是留给有准备的人！2016年7月，我通过长飞公司的校园招聘，成功进入了长飞光纤光缆沈阳有限公司。刚进入公司，虽然我的技术不很熟练，但我一步步努力学习、认真做好本职工作，得到了同事的大力帮助，公司也给了我很大的发展空间，并有幸得到了这次总部之行的机会。

公司总部的雄伟壮观和先进的生产技术让我为之惊叹，总部的光纤部和科技园参观让我大开眼界，公司对科研项目十分重视，在光纤部我们穿着专用的洁净服参观了光纤的生产过程，以及总部自主研发和改进的设备。通过参观总部的管理和流程，我发现我们还有很多不足，也还有很大发展空间。

在参观完光纤部后，我们又参观了公司最大的生产基地——科技园，刚进入科技园，我就被科技园的企业文化深深吸引。在车间现场环境和6S管理方面，每位员工都穿戴着公司发放的工作服及劳保鞋，更重要的是辅助工具存放有序，长飞科技园在企业管理以及文化等方面值得我们学习。

长飞能在光纤光缆领域做到“全球第一”，这与全体长飞人的共同努力密不可分。我相信长飞沈阳将来也会像科技园中的管理一样到位，因为我们是站在“巨人的肩膀上”，我们会看得更远、飞得更高。

我有幸参加了长飞春晚，春晚上处处都是才华横溢的长飞人。领导的讲话让我对长飞有了更深的了解，也感受到了长飞雄厚实力。在长飞春晚上我得到了人生的第一个奖杯，我十分紧张，但我也非常自豪，因为站在舞台上不是我一个人，代表的更是长飞沈阳的所有兄弟姐妹。

这一路走来，我更加坚定自己的意志，下定决心奉献自己的力量，我会做一个有责任心的长飞人，我为我是长飞人感到骄傲，也希望有一天长飞因为有我更加精彩。我们长飞沈阳公司的员工也将用青春热血描绘属于长飞沈阳的辉煌！

The Visit to Wuhan, the Dream of YOFC — A Visit to YOFC headquarters

☐ Li Chao from YOFC (Shenyang)

Opportunities will always be there for those who are prepared. Through the campus recruitment of YOFC, I successfully entered Yangtze Optical Fiber and Cable (Shenyang) Co., Ltd. (hereinafter referred to as "YOFC") in July 2016. Although I was not very skilled when I was new to the company, I studied hard and did my job well with the help of my colleagues. The company also gave me a lot of room for development. This time I'm so lucky to get the change to visit the headquarters.

The grandeur of the headquarters and the advanced technology amazed me so much, while the visit to the optical fiber department and the science park opened my eyes. The company attaches great importance to scientific research projects. In optical fiber department, we visited the production process of optical fiber and the equipment independently developed and improved by the headquarters in dedicated clean room suits. By visiting management and processes at headquarters, I found that besides many deficiencies, these still exited great development space.

After visiting optical fiber department, we was showed around the science park, the largest production base in the company. Just entering the science park, I was soon deeply attracted by the corporate culture of it. In workshop environment and 6S management, each employee wears the work clothes and shoes issued by the company and auxiliary tools are stored in an orderly manner. YOFC science park is worth our study in enterprise management, culture and many other aspects.

The possibility to achieve "world's first" for YOFC in optical fiber and cable industry is inextricably linked to the joint efforts of all YOFC men. I truly believe that the management of YOFC (Shenyang) will be as great as that of the science park and we will see farther and fly higher, since we are standing on the shoulders of giants.

I was privileged to participate in the Spring Festival Gala of YOFC, where talented YOFC men constantly appeared. The leader's speech gave me a deeper understanding of YOFC and a deeper feeling of the strength of it. I got my first trophy in the gala. Besides feeling nervous, I was very proud because I represented not only myself on the stage, but also all colleagues in YOFC (Shenyang).

After the visit, I'm more determined to devote all of my strength to the company. Feeling proud of being a YOFC man, I will be more responsible and I hope that I can make a valuable contribution to the company. We YOFC (Shenyang) employees will contribute all of our talents to the splendid future of our company.

長飛頌

□长飞兰州公司 伏一鸣

在那个繁花似锦的夏天
沉寂了许久的秦王川大地苏醒了
耕作了百年的人们盼来了希望

转眼间，来到了金桂飘香的初秋
在这片生机勃勃的土地上
辛勤的长飞人挥洒汗水
为贫瘠的西北架起了通信的桥梁

如今，辞旧迎新的季节
寒冬的脚步徐徐远离
春天向我们款款而来
我们欢聚在一起
回忆峥嵘岁月 展望万里前程

歌声里沉淀着成长的岁月
鲜花与赞美萦绕在殿堂
在这个属于长飞兰州的青春舞台
在走向明天的辉煌之夜
我不禁思绪飞扬

2016年悄悄画上了句号
她带给我们太多的记忆
太多的付出太多的收获
太多的感恩太多的感动
太多太多……

感谢我们的家人
长夜里
为我们留一份温馨的守候
那里有母亲的饭香，父亲的叮嘱
让我们忘记一天的疲惫
把责任与义务深深牢记

感谢我们的同事
风雨中
我们同进退，共荣辱
历经寒来暑往
同伴春夏秋冬
赢得的是生产效率的突破
收获的是胜利凯旋的擂鼓

感谢我们的领导
这一路
您是远航中的舵手
鼓励我们勇往直前
教导我们逐渐成长
中流击水，浪遏飞舟
您带着我们创造奇迹，实现梦想

来吧，新年的春天
感谢你唤醒了沉睡的冻土
带给我们阳光和雨露
感谢浩荡春风吹绿了山岗
带给我们希望与勇气

在这片复苏的田野上
我们将凭借勃勃生机
培育出累累硕果
书写属于长飞的壮丽篇章

Ode to YOFC

☐ Fu Yiming from YOFC (Lanzhou)

In that summer, with blooming flowers
Qinwangchuan woke up after a long silent hibernation
People farming for hundreds years saw hopes

Not before long, early autumn came in sweet aroma of osmanthus
On this vital and alive land
Industrious YOFCers working hard
Built a communication bridge for the barren northwest China

Out with the old, in with the new
Bittering winter is away gently
Spring comes to us gracefully
Together we are
To look back on the wonderful times and the promising future ahead

Singing told the growth days we experienced
Hall is filled with flowers and praise
Standing at the youth stage for YOFC
At the glory night to tomorrow
Lots of feelings arise in my mind

Ended 2016 quietly
She brings us too many memories
Loads of efforts and gains
Loads of gratitude and moving moments
Loads of …

Thanks for our families
In the long night
They are our sweet expectation at home
Where mother's delicious cuisines and father's concerns
Relieve our tiredness of a day
And remind us of our duties and obligations

Thanks for our colleagues
In wind or in rain
We work together and share the glory
Seasons come and go
We walk together from spring to winter
What we make is the breakthrough of production efficiency
What we get is the applaud for the victory

Thanks for our leaders
All the way along
You are the pilots of the sailing ship
Give us courage to moving on
Help us grow up by instruction
Swimming mid-stream, we struck waves to impede
That boats which passed at flying speed
You lead us in creating miracles and realizing dreams

Welcome, the new spring
Thank for your waking up the frozen land
For the sunshine and rain you bring us
Thanks for the mighty spring wind greening the mountains
For the hope and courage you bring us

Standing in the field recovering from winter
We will produce abundant fruits
By vitality and energy
And write a magnificent chapter for YOFC