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YOFC TODAY

今日长飞

目录 Contents

刊首语 Foreword 01/02

在国际化的道路上阔步向前 /01
Great Strides Forward in the Internationalization Road /02

新闻 News 03/09

要闻 /03
Important News /03

长飞与印尼 PT Monas 合资成立光纤制造公司 /03
YOFC and PT Monas Establishing A Joint Venture Company in Fibre Manufacturing /04
长飞公司第二批党的群众路线教育实践活动总结会议召开 /05
The Second Party's Mass Line Educational Practice Conclusion Meeting was Held in YOFC /06

简讯 /08
Brief /08

庄丹总裁为湖北省质检局机关干部讲课 /08
YOFC CEO Dr. Zhuang Dan gave training to officers of Quality and Technique Surveillance Bureau of Hubei Province /08
"长飞"品牌再获湖北名牌 /09
YOFC is Awarded "Business Model for National Technology Innovation" /09

专题 Topics 10/15

STD 光纤跳线组装实现流线化 /10
The Streamline Production Applied to the Assembly of Optical Fibre Patch Cord /13

2015 年 03 月　总第 96 期

The 1st Issue March 2015 Total Issue 96

管理 Management 16/22

六西格玛方法在降低光纤生产不良中的应用 /16

Application of Six Sigma Method in Reduce the nonconformity ratio of Optical Fibre Production /19

随笔 Essays 23/24

一城一味 /23

One City with One Flavor /24

员工风采 Employee 25/37

长飞公司举办第一届密室逃脱比赛 /25

YOFC First Room Escape Game /26

长飞公司第五届青年篮球比赛小记 /27

Note for the YOFC'S 5th Youth Basketball Match /28

长飞公司第二届电竞比赛落幕 /29

YOFC's the 2nd E-sports Game Ended /30

第三届"长飞好声音"比赛小记 /31

A Brief Report of the Third Voice of YOFC /32

2015 年"奔跑吧！长飞"春节联欢晚会 /33

2015 "Running YOFC" Spring Festival Gala Evening /34

《今日长飞》

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在国际化的道路上阔步向前

■ 本刊编辑部

从去年底的成功登陆港股，到今年初与印尼 PT Monas Permata Persada 有限公司在武汉签署合资成立光纤制造公司的合作协议，长飞公司正一步步接近自己的国际化目标：成功登陆港股，加速了全球化布局；与 PT Monas 合作的合资项目是长飞在海外的第一个光纤合资项目，是长飞上市后走向海外的又一个里程碑，标志着长飞国际化、全球化战略步伐进一步加快。

工欲善其事，必先利其器。经过二十多年的发展，长飞公司终于在国际化之路上亮剑，得益于多年来的积累与沉淀。这么多年来，长飞公司不仅在科技创新、产品研发和销售上在全球光纤光缆行业占有一席之地，在品牌建设上也不遗余力，长飞的品牌影响力在海内外都已经显现出来。正因为如此，长飞公司的国际化之路才能够如此顺畅。

积土成山，非斯须之作。国际市场风云诡谲，要想取得国际化的真正成功，并非一朝一夕之功，必须树立牢固的基础，方可赢得长久发展的机会。首先要做的就是苦练内功，做好产品研发和创新，这虽是老生常谈，却也是企业生存的根本；其次要做的便是以客户为中心，想客户之所想、急客户之所急，方能赢得客户；再就是树立良好的企业形象，加强品牌建设。

在国际化之路上，长飞已经有了一个良好的开局，这对下一步的发展是美好的预示且拥有正向激励作用。在如此好的势头下，如果长飞能够借着这股东风，昂首阔步，在国际化之路上必将有新的斩获。

Great Strides Forward in the Internationalization Road

■ The Editorial

YOFC is striding forward in the internationalization road, one step closer to their goal of internationalization along with its double happiness around 2015 New Year. In December, 2014, YOFC successfully went public in Hong Kong Stock Exchange, greatly accelerating globalization layout. At the beginning of 2015, YOFC signed the cooperation agreement of establishing a joint venture fiber manufacturing company with Indonesia PT Monas Permata Persada Co., Ltd in Wuhan, which stands out as another new milestone towards abroad after listing, marks YOFC's further accelerated pace towards internationalization and globalization.

Adequate preparation comes before success. After twenty years of development, YOFC stands out in the road of internalization out of years of accumulation and precipitation. Over the years, YOFC not only holds a place in the global optical fiber and cable industry in technological innovation, product development and sales, but also spares no efforts in brand building revealing its great brand influence home and abroad. Thanks to the full preparation, YOFC's internationalization road turns out so smooth.

Rome was not built in a day, and it will take great time and efforts to realize complete internationalization. The international market changes every second, thus a solid foundation should be established to respond to the potential challenges for further development. First and most important, we should improve our skills, products and innovation, which are the fundamental survival of enterprises. Secondly, we should be customer-centric by thinking what they think, worrying what they worry and thus winning their trust. Then, we should establish a good cooperate image and strengthen our brand building.

A good beginning in the road of internalization promises a better future for YOFC with great positive energy. Under such a good momentum, YOFC will stride forward in and internalization road to obtain new harvests.

长飞与印尼 PT Monas 合资成立光纤制造公司

■ 战略中心　柳青

2015 年 1 月 19 日，长飞光纤光缆股份有限公司（以下简称“长飞”）与印尼 PT Monas Permata Persada 有限公司（以下简称“PT Monas”）在武汉签署了合资成立光纤制造公司的合作协议。

新成立的光纤制造公司将是印尼第一家光纤企业，项目实缴资本为 10,000,000 美元，合资双方持股比例为 70：30（长飞 70%，PT Monas30%），以现金出资。

2013 年习总书记在湖北视察长飞时，就曾勉励长飞加快国际化发展。去年底，长飞成功登陆港股，依托“一带一路“战略，加速了全球化布局。本次合资项目是长飞在海外的第一个光纤合资项目，是长飞上市后走向海外的又一个里程碑，是长飞与 PT Monas 间的强强联合，标志着长飞国际化、全球化战略步伐进一步加快。作为全球第一的预制棒供应商和全球第二的光纤光缆供应商，长飞公司拥有良好的品牌和先进的技术。PT Monas 在印尼拥有很好的客户和政府关系，熟悉当地电信市场。两家的强强联合、互惠合作，将有利于实现双方资源互补，提升核心竞争力，参与印尼及东盟的市场竞争，争取更大的市场份额。

印尼拥有 2.52 亿人口，是全球第四大人口国，近年来政局稳定，经济发展平稳。然而，电信产业发展相对缓慢，互联网用户和宽带普及率较低。对此，印尼政府推出了国家宽带计划，大幅推动互联网和宽带发展。因此，可以预期印尼将迎来光网络建设的高峰，光纤光缆市场需求潜力巨大。在巨大的市场机遇下，长飞与 PT Monas 合资成立的新光纤厂无疑是顺应潮流之举。新公司将在整合股东双方的优势资源的基础上，立足印尼，辐射周边国家和区域，力争成为印尼乃至东盟地区最具影响力的光纤供应商。

YOFC and PT Monas Establishing A Joint Venture Company in Fibre Manufacturing

Strategy Centre Liu Qing

January 19, 2015, in Wuhan, China, Yangtze Optical Fibre and Cable Joint Stock Limited Company (hereinafter referred to as YOFC) and Indonesian PT Monas Permata Persada Co. Ltd. (hereinafter referred to as PT Monas) signed an agreement of establishing a joint venture company in fibre manufacturing.

The new company will be the first fibre manufacturing enterprise in Indonesia, the total contribution of capital is $10,000,000 in cash, and the shareholding ratio is 70% (YOFC) and 30% (PT Monas).

In 2013, President Xi inspected YOFC and had encouraged the globalization development of the corporation. In the end of last year, YOFC was successfully listed on Hong Kong Stock Exchange, which accelerated globalization layout according to the "one area one road" strategy. The new company is the first overseas optical fibre joint venture project of YOFC, is another milestone to the globalization development after listing, is the alliance between two powerful companies, which refers to the further acceleration in the applying globalization strategy of YOFC. As first supplier of optical preform and the second supplier of optical fibre and cable in the worldwide, YOFC has good reputation and advanced technology. Meanwhile, PT Monas has great customer and government relationship in Indonesia and is familiar with domestic telecom market. The powerful alliance and mutual cooperation between the two corporations are beneficial for resource complementary, improving core competitiveness, participating in the market competition of Indonesia and ASEAN, and striving for great market share.

Indonesia has a population of 252,000,000, is the world's fourth most populous country. In recent years, Indonesia has political stability and steady economic development. However, the telecom industry development is relatively slow (the users of the Internet is few and broadband penetration is low). In this regard, Indonesian government launched the national broadband plan for promoting the development of domestic Internet and broadband. Therefore, Indonesia has a great chance to usher the peak of optical network construction and potentially huge market demand in optical fibre and cable. In this case, the new joint venture plan of YOFC and PT Monas meet the great market opportunities. In the basis of the integration of two shareholders' advantageous resources, the new company will take Indonesia as base and radiate the surrounding countries and areas for striving in becoming the most influential fibre supplier in Indonesia and ASEAN region.

Translated by Cao Xiaojuan

巩固活动成果　助力长飞发展

——长飞公司第二批党的群众路线教育实践活动总结会议召开

本刊编辑部

2015 年 1 月 14 日，长飞公司党委召开第二批党的群众路线教育实践活动总结会议，重点总结了公司党委教育实践活动的开展情况，对进一步抓好转变作风、建设长效机制作出了安排。公司党委书记、董事长文会国，党委副书记、董事郑慧丽，党委副书记、工会主席王沙京，各支部书记、支委参加会议。会议由王沙京主持。

会议开始后，党委副书记、董事郑慧丽首先对教育实践活动小组去年开展的三个阶段的工作进行了回顾，并对活动表示了肯定。她介绍说，本次活动的亮点是密切联系实际，与公司的生产经营活动紧密联系在一起。活动的开展既促进了公司的生产经营，对我们的业绩也起到了良好的正向推动作用。

随后，党委书记、董事长文会国对长飞光纤光缆股份有限公司党的群众路线教育实践活动作工作进行了总结。他指出，长飞公司有自己的特殊性，尽管活动开展的简单，但

Activity Results Consolidation Helps YOFC Develop

——The Second Party's Mass Line Educational Practice Conclusion Meeting was Held in YOFC

The Editorial

The second Party's mass line educational practice conclusion meeting was held on Jan. 14th, 2015 in YOFC, laying stress on the educational practice progress carried out by Party Committee's and making arrangement on doing a good job of work style change and building long-term mechanism. The secretary of the Party Committee and chairman of the board Wen Huiguo, deputy secretary of the Party Committee and director Zheng Huili, deputy secretary of the Party Committee and chairman of the Trade Union Wang Shajing, each branch secretary and committee member attended the meeting, over which was presided by Wang Shajing.

After the meeting begun, the deputy secretary of

我们还是按照要求，认真完成了每个环节。因此，总结很有必要。

第一，长飞公司自觉地、认真地开展了党的群众路线教育实践活动。党委文件有明确规定，长飞公司属于混合制所有企业，可以根据具体实际情况来展开，也就是说不必按照党政机关、国有企业、事业单位的方式来开展。在活动布置了以后，大家很自觉地做这件事情，虽然形式相对简单，但三个阶段的活动都严格地按照群众路线教育实践活动的要求去组织开展。

第二，长飞公司开展教育实践活动有很大的收获。广大党员、党员干部通过这次活动接受了一次教育，知道了群众路线教育实践活动的意义、目的；通过查摆企业发展过程中的问题，并且将这些问题反馈给公司管理层，要求他们充分注意、积极整改，所以对公司的加强管理、改进作风，起到了积极的推进作用；把群众的意见集中起来以后，公司在管理工作上有所加强，在遵守八项规定、反“四风”的一些具体行为上有明显的改进；使党组织在企业的领导作用得到了加强和提高。

第三，要巩固群众路线教育实践活动的成果。活动的目的就是教育、整改、巩固、改进管理和作风，我们公司也要巩固这方面的成果，始终要把贯彻中央的八项规定、反“四风”放在心上；活动中提出了一些整改的问题，还要回头看、回头评估，今后在适当的时候我们可以收集一点意见；党员、党员干部要自我严格要求，严以自律，模范带头，在工作当中要把好关。

会议结束前，党委副书记、工会主席王沙京对未来的工作提出了几点意见，他希望各个支部要严格按照公司党委的整体部署和要求，认真地抓好贯彻落实，切实把活动中形成的工作作风和工作方法保持下去；将建立健全的制度有效运转起来，不断巩固和扩大教育实践活动成果；以更高的政治热情、更加振奋的精神状态、更加扎实的工作举措，为推进长飞更好、更快地发展做出新的、更大的贡献。

the Party Committee and director Zheng Huili reviewed the work which had been carried out by the educational practice group last year and praised the activity. She introduced that the highlight was to closely contact with the reality and YOFC's production and management activities. Its kick-off helps the company's production and management and propels our achievements towards a better direction.

Afterwards, the secretary of the Party Committee and chairman of the board Wen Huiguo summarized Party's mass line educational practice. He pointed out that YOFC had his own characteristics. Although the activity was simple, we carefully finished each process according to the requirements. Therefore, the conclusion was very necessary.

Firstly, YOFC consciously and seriously carried out the Party's mass line education practice. Documents of the Party Committee stipulate clearly that YOFC belongs to mixing system ownership enterprise and can implement it according to the actual situation. It's not necessary to launch the practice with the same way as the Party and government offices, state-owned enterprises and state-run institutions do. Although the form was relatively simple, everyone consciously did it after the practice had been assigned and practice for three periods was strictly developed according to mass line educational practice requirements.

Secondly, YOFC gains a lot from the educational practice. Party members and cadres received an education through the activity and knew the mass line educational practice significance and purpose. We found out the problems existed in the enterprise development and fed them back to the management people for their attention and active correction. It played a positive role on management strengthening and work style improvement. YOFC abided by eight regulations and had clear improvements on some concrete actions after collecting masses' opinions so that the Party organization' leadership role has been raised.

Thirdly, consolidate mass line educational practice achievements. Its purpose was to educate, consolidate and revamp management and work style and YOFC would strengthen the achievements, keep the regulations of the Party Central Committee in mind, review the problems proposed in the activity for rectification and appraisal and collect some opinions in the suitable moment in the future. The Party members and cadres should have strict requirements on themselves and take exemplary role.

The deputy secretary of the Party Committee and chairman of Trade Union Wang Shajing proposed some expectations. He hopes that each Party branch can carefully make implementation and keep the work style and methods formed in the activity according to Party Committee's arrangements and requirements to effectively run the healthy system and continuously strengthen and broaden educational practice achievements to make greater contributions for YOFC's better and quicker development with high political enthusiasm, inspired mental status and better work measures.

Translated by Zhao Xuan

庄丹总裁为湖北省质检局机关干部讲课

YOFC CEO Dr. Zhuang Dan gave training to officers of Quality and Technique Surveillance Bureau of Hubei Province

新春伊始，长飞公司总裁庄丹为湖北省质监局系统各级干部进行了一次关于企业质量管理实践以及长飞公司在质量管理方面的经验的培训。

2 月 25 日，政府机关干部春节假期后第一天上班，省质监局就举办了“适应新常态、争取新作为、开创新局面”的干部培训。此次培训特邀请了长飞公司总裁庄丹，就企业质量管理方面的实践给大家进行“实战”的培训。省质监局副局长周德文主持培训会议，省质监局局长黄国庆以及省局机关各级干部参加了培训。在两个小时的培训过程中，大家仔细听讲，认真记笔记，听众的投入度很高。会后，据省局质量处王处长的反馈，此次邀请企业家讲课，大家觉得很有收获。培训有理论，有实际，内容丰富精彩。今后应该举办更多这样的有企业家参加的培训课程。

Dr. Zhuang Dan, CEO of YOFC, presented the training seminar to the officers of Quality and Technique Surveillance Bureau of Hubei Province just after the Chinese New Year.

The Quality and Technique Surveillance Bureau of Hubei Province held the training seminar at 25th of February. They invited Dr. Zhuang Dan as one of the trainer of the seminar. The director general of the Bureau and other officers attended the seminar. The topic of Dr. Zhuang's presentation related to the practice of quality management in YOFC, and also what is been doing for the quality management in the industry. The audiences were very much involved during the two-hour presentation. They said that the presentation from enterpriser was very good because it involved theory as well as practice. They hoped that they need more similar training course in the future.

“长飞”品牌再获湖北名牌

YOFC is Awarded “Business Model for National Technology Innovation”

■ 运营管理中心　田巧丽
Operartion and Management Centre Tian Qiaoli

2015 年 1 月 26 日上午，全省质量技术监督工作会议在湖北省质量技术监督局召开。会上，湖北省质监局局长黄国庆为长飞光纤光缆股份有限公司的长飞牌通信光缆颁发了“湖北名牌”荣誉奖牌。至此，长飞公司已第五次获得该荣誉称号。

凭借过硬的产品质量和良好的市场信誉，“长飞”品牌通信光缆连续多年蝉联武汉名牌和湖北名牌；2006 年 “长飞牌”通信光缆还获得“中国名牌”称号；2014 年“长飞”商标获得了中国驰名商标。随着多元化战略和国际化战略的实施，长飞连续多年获得“全球光纤光缆最具竞争力企业”第二名，业已跻身世界级品牌行列，其影响力正随着全球市场的扩张而快速上升。

January 26, 2015, the Hubei province's quality and technical supervision conference held in Hubei Quality Supervision Bureau (HQSB). At the meeting, the leader of HQSB Mr. Huang Guoqing awarded to YANGTZE OPTICAL FIBRE AND CABLE JOINT STOCK LIMITED COMPANY （YOFC）for "Hubei Famous Brand". So far, YOFC has this honor for five times.

With excellent product quality and good reputation in the market, "YOFC" cable honored "Hubei Famous Brand" and "Wuhan Famous Brand" for many years; "YOFC" cable also received the "China Famous Brand" in 2006, "YOFC" trademarks won the well-known trademark in 2014. With the implementation of the diversification strategy and internationalization strategy, YOFC become the second competitive enterprises of global optical fiber and cable industry, now YOFC has gradually been raised to the rank of world-class brands, whose influence is expanding by the rapid increased global market.

STD 光纤跳线组装实现流线化

战略中心　王伟

光纤跳线，是连接两根光纤或光缆形成光通路并且可以重复使用的无源连接光器件。光纤跳线已经广泛应用在光纤传输线路、光纤配线架、光纤测试、仪表中，其种类众多，结构多样。

光纤跳线的性能，除光学性能之外，还要考虑光纤连接器的互换性、重复性、抗拉强度、温度和插拔次数等。本文描述公司光纤跳线组装生产流线化项目的实施过程。

光纤跳线市场需求特点：订单产品多样化、交期紧迫、手工操作频繁、不同客户定制要求不同。随着竞争愈发剧烈，人力成本不断提升，生产效率的提高迫在眉睫，要求以有限的人力、资源，更加快速的响应客户需求，形成良性循环的持续改善氛围，不断提升效率，降低成本。为解决这些问题，IT与持续改进部和终端业务部组建了项目组，拟定项目目标，制定改善计划并实施。

组装流线化项目的 8 个步骤介绍如下（见图 1）：

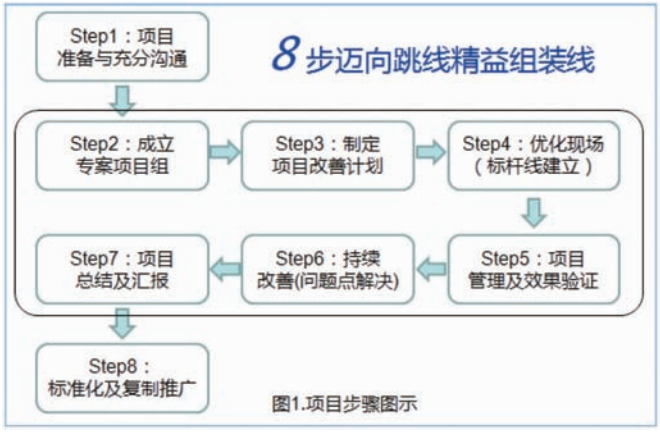

图1.项目步骤图示

Step1.项目准备与充分沟通

好的开始是成功的一半，充分沟通尤为重要。项目准备阶段主要包含以下几个方面：

1.1.光纤跳线生产现状调查

器件组在完成目视化改善和标准作业培训之后，人均生产效率可达成 18 头 / 小时，由于频繁换型、人员变动等因素，效率不升反降，只能通过加班或增补人力来完成生产任务。并且现场存在等待、寻找、重复搬运等时间浪费的现象。借助标准工时和精益生产八大浪费工具对“工时去哪里了”进行了深入研究。

1.2.流线化雏形讨论

收集相关资料并结合光纤跳线的生产实际，通过图纸、视频和仿真等方式，对线性传送带、捆扎式生产、细胞拉式生产以及服装自动吊挂流水线等生产模式与供应商进行讨论和权衡，最终确定以皮带式流水线为硬件载体，先实现生产线流线化，再进一步导入细胞拉式生产系统。

Step2.成立专案项目组

流线化项目得到了领导的大力支持，该项目涉及生产效率、交期、品质、物料、硬件改造等多个方面，在项目组中均明确指定责任人，定义其职责分工，成立专案小组，为后期的项目进度如期完成提供有力保障。

Step3.制定改善项目计划

3.1.确定项目目标

以流水线替代现状批量加工模式，减少重复取放，产品快速有序流动实现作业效率提升，项目组从优化物料配送、加强 QC 控制、完善辅助模块支持，减少因物料、品质异常造成的工时浪费等各方面着手，最终确定三个项目指标及其预期改善幅度(见表 1)。

3.2.制定项目计划

按照 5W1H 对项目内容进行梳理，从明目的、定目标、选方案、制计划四个方面输出项目计划书，明确项目阶段、工作内容、责任人、计划完成时间等要素，同时召开项目启动会对项目计划进行说明，确保每位责任人明确项目内容和时间节点。

Step4.标杆线建立

4.1.生产线平衡设计

4.1.1 标杆线产能设计：确定 T/T(Takt time)。T/T 即为节拍时间，首先选定 LC-0.9 紧套纤为试线产品，采用托盘(6Pcs 光纤跳线)传动周转，确定标杆线节拍时间为 3.4min 。同时也为其它产品设置节拍时间。

4.1.2 改善工站作业方法和设备治具，更新标准工时库：对研磨工站和穿纤固化工站进行人机联合作业分析，通过增加研磨治具，将员工的等待时间（研磨机运转时，员工会出现 3.5min 左右的等待时间）运用起来，人员工时利用率提升约 40%，单批加工时间由 8.2min/ 批降低至 5.8min/ 批，单根跳线研磨工站时间下降约 29%，详见图 2。而穿纤固化工站则将大治具盘(48Pcs/ 盘)一分为二，提升固化炉利用率，单批加工时间由 6.0min/ 批降低至4.9min/ 批，人员工时利用率提升约15%。

图2.人机联合作业改善-研磨机

分析图-现状

操作员（时间min）			研磨机(时间min)		
装夹(将连接器装至治具盘)	2.1		被占用	2.1	
装去胶片	0.3		被占用	0.3	
空闲			去胶	0.7	
装粗磨片	0.3		被占用	0.3	
空闲			粗磨	0.7	
装细磨片	0.3		被占用	0.3	
空闲			细磨	0.7	
装精磨片	0.3		被占用	0.3	
空闲			精磨	0.7	
装抛光片	0.3		被占用	0.3	
空闲			抛光	0.7	
卸夹(将连接器从治具盘拆下)	1.1		被占用	1.1	

分析图-改善后

操作员（时间min）			研磨机(时间min)		
装治具盘A	0.5		被占用	0.5	
装去胶片	0.3		被占用	0.3	
拆夹(治具B)	0.7		A去胶	0.7	
装粗磨片	0.3		被占用	0.3	
拆夹(治具B)	0.7		A粗磨	0.7	
装细磨片	0.3		被占用	0.3	
装夹(治具B)	0.7		A细磨	0.7	
装精磨片	0.3		被占用	0.3	
装夹(治具B)	0.7		A精磨	0.7	
装抛光片	0.3		被占用	0.3	
装夹(治具B)	0.7		A抛光	0.7	
卸夹A	0.3		被占用	0.3	

1.C/T降低：即5.8min产出LC跳线12根，以5.8min为周期，较改善前降低2.4min，降幅约29%；
2.设备&人员利用率提升：研磨机设备利用率由43%提升至60%；操作员利用率由57%提升至100%

4.1.3 采用 ECRS 设定作业工站及其作业内容。首先对各工站作业内容进行拆解和重新组合，以减少走动和重复取放、降低工具更换频次为原则，将部分线上作业剥离分摊给辅助人员，再将相邻工站组合为铁三角，为生产线平衡图绘制分析做好准备。

4.1.4 绘制生产线平衡山积图，制定流水线线工站作业指导书。经过以上步骤的调整，最终输出 LC0.9 紧套纤生产线平衡山积图，理论上平衡率可达成 86%。

4.2.流水线硬件布建

4.2.1.如果说生产线平衡设计是软件部分，那流水线布局则是硬件部分。项目组内部多次召开讨论会议，搜集生产现场操作人员的反馈，汇总每个工站的需求并进行定制设计，如测试设备由横放改善为倾斜 45° 放置，便于插芯对位和屏幕数据查看；工作台面设计物料盒凹槽，便于物料取放等。最终将改善细节绘制为 CAD 图纸，作为流水线布建的依据。

4.2.2.对于流水线硬件部分，STD 群策群力，充分利用生产资源，从终端组借用注塑机自动下料暂时闲置的两条皮带线，经过工程师的改造和调整，使皮带线速度匹配生产线节拍，满足产品的传送需求。

Step5.项目管理及效果验证

5.1.项目管理：在项目执行过程中，主要通过例会形式对项目进度和问题点进行总结讨论，坚持在现场实地查看问题点并制定解决方案，充分调动一线操作员参与优化项目的积极性。

5.2.效果验证：由生产工程师组织试产，并连续统计每天的产出、人力投入工时及现场问题点，持续监控试产阶段的生产效率。

Step6.持续改善

在组装流水线试产的基础上，对辅助人员工作进行模块化设计，如物流模块，设置专人作为水蜘蛛(Water Spider)，将其日常工作内容书面化，形成物流配送模块作业指导书，使组装操作人员不用催料、不用预装、不用分拣、不用自检；对检验模块制定 SIP(检验作业规范)，明确首件检验、抽检、终检等检验要求；同理将包装作业模块单独列出，制定 POP(包装作业规范) 并将填写生产任务完成看板列入其工作内容。(图 3)

图3. 辅助模块持续改善说明图

针对产品切换后部分工站工作量不足等问题，将连接器预装等列入其工站作业内容，以提升其工作饱和度。

由 IT 部门在产品上加装射频识别卡，并在工站安装识别设备，以实现数据自动采集功能，消除员工填写标签卡的工时浪费(略)。

Step7.项目总结及汇报

光纤跳线生产流线化项目运行约 8 个月，经过项目组的共同努力，最终达成预期项目目标(表 1)

表1-指标改善前后对比表

#	项目指标	目标值	改善前	改善后	改善幅度	单位说明
1	UPPH	UP 15%	18	22.4	24%	人均每小时产出连接器头数(头/人.小时)
2	单位面积产出	UP 30%	46.3	61.7	33%	每平方米场地产出连接器头数(Pcs/㎡)
3	人力标准工时	Down 10%	2.1	1.87	9%	光纤连接器从剥纤至包装的人力工时总和(min)

Step8.标准化及复制推广

在标准化工作方面，及时修订标准工时数据库、人机联合作业分析图、SOP、SIP 和 POP 并在现场进行更换和培训。在第一阶段项目结案之后，还将根据光纤跳线生产特点研究导入细胞拉式生产系统，继续提高生产效率，同时提升生产系统的柔性和快速响应能力。

总结光纤跳线流线化第一阶段的改善项目，得益于项目前期的充分讨论和准备，工业工程相关工具的实际应用，全员参与以及项目过程中高效的执行力，项目组成员对过程和结果精益求精，以上都是此项目成功的关键因素。

The Streamline Production Applied to the Assembly of Optical Fibre Patch Cord

Strategy Centre Wang Wei

Optical Fibre Patch Cord is a kind of reusable passive optical device, what is Connecting two optical Fibres to form a light path. It has been widely used in Fibre optic transmission lines, Fibre optic patch panels, Fibre optic test and instrumentation, which is a wide variety of items.

In addition to the optical properties, the performance of patch cord includes the interchangeability, repeatability, tensile strength, temperature and frequency of usage. This paper describes the implementation process of patch cord's assembly streamline project.

Patch cord is diversification of market demand, in faster delivery time, additional customers' demands and less developmental costs. ICI and STD set up a project team to solve these problems with lean production theory. The eight steps of assembly streamline project is shown in figure 1:

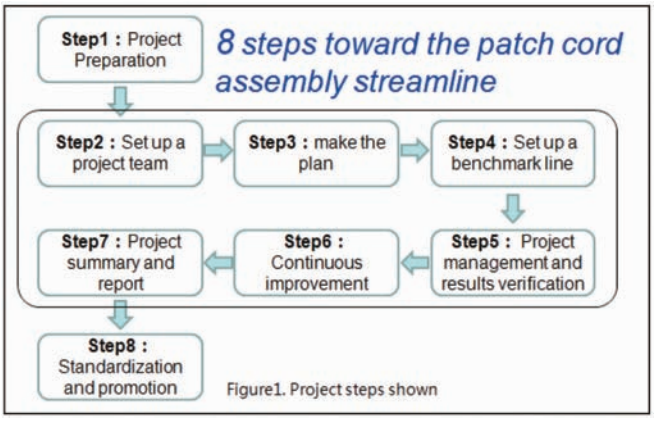

Figure1. Project steps shown

step1: Project Preparation

A good beginning is half done. Full communication is particularly important. the Project preparation include the following aspects:

1.1 current situation investigation.

As a result of the visual control system and SOP training, UPPH is up to 18. However, due to the frequent change-type factors, changes in personnel, the efficiency is falling. Production tasks can only be accomplished through the addition of overtime or human. Meanwhile, the waste, such as waiting, motion, transportation and others, appears in the workshop.

1.2 discussion of the streamline

The project team has discussed and compared some plans, such as belt line, banding type production, cell system and clothing-handing pipeline, by CAD, video and simulation. then , we determined the belt line as the hardware support.

Step2.set up a project team

The project, which has been the strong support of the leadership, involves a number of aspects of production efficiency, delivery, quality, materials, and improvement in hardware. It provides effective protection for the timely completion of the project schedule by appointing responsible persons specifically, defining the division of responsibilities and setting up special project groups.

Step3.make the plan

3.1. determine the project objective

Through the pipeline instead of batch processing mode, re-

ducing repetitive movements, product flowing quickly and orderly, operation efficiency achieves the improvement. The project team finalized three project indexes and the margin expected to improve, from the optimization of material distribution, strengthen QC control, improving auxiliary module support, reducing the waste caused by the materials and the quality.

3.2. make the project plan

We sort the project content according to the method of 5W1H, from set goals, take options, made plans to export proposals, which include project phases, work content, responsible, planned completion time and other factors, meanwhile, we convene a kick-off meeting to ensure that every person responsible clearly content and deadline.

Step4.Set up a benchmark line

4.1. Balance rate analysis

4.1.1. Determine the capacity: we calculate the takt-time needed to meet demand of customer, first chose LC-0.9 as the sample, its takt time to be 3.4min. The streamline transfer products by the use of pallet. Similarly, we calculate the takt-time for other Products.

4.1.2. Update standard time by improve work methods. Equipment and fixtures: We analyzed lap machine and curing oven with multiple activity operation chart, the personnel utilization was improved about 40% by increasing the grinding fixture, the cycle-time reduced from 8.2min to 5.8min because the waiting time was reduced (figure 2). The fixture of Curing oven was divided into two, its personnel utilization was improved about 15%, the cycle-time reduced from 8.2min to 5.8min.

Figure2.multiple activity operation chart-lap machine

Before improve

operator(min)			lap machine(min)		
clamp the fixture	2.1		be occupied	2.1	
Install remove the glue	0.3		be occupied	0.3	
waiting			remove the	0.7	
Install Coarse grinding	0.3		be occupied	0.3	
waiting			Coarse	0.7	
Install fine grinding sheet	0.3		be occupied	0.3	
waiting			fine grinding	0.7	
Install accurate grinding	0.3		be occupied	0.3	
waiting			accurate	0.7	
Install polishing sheet	0.3		be occupied	0.3	
waiting			polishing	0.7	
Unload the fixture	1.1		be occupied	1.1	

After improve

operator(min)			lap machine(min)		
clamp the fixture A	0.5		be occupied	0.5	
Install remove the glue sheet	0.3		be occupied	0.3	
Unload the fixture B	0.7		remove the glue of	0.7	
Install Coarse grinding sheet	0.3		be occupied	0.3	
Unload the fixture B	0.7		Coarse grinding A	0.7	
Install fine grinding sheet	0.3		be occupied	0.3	
clamp the fixture B	0.7		fine grinding A	0.7	
Install accurate grinding sheet	0.3		be occupied	0.3	
clamp the fixture B	0.7		accurate grinding A	0.7	
Install polishing sheet	0.3		be occupied	0.3	
clamp the fixture B	0.7		polishing A	0.7	
clamp the fixture A	0.3		be occupied	0.3	

1.C / T lower: the cycle time was decreased from 5.8 to 3.5 per pitch ;
2.The increase of utilization: the utilization of lap machine increased from 43% to 60%; the utilization of operator increased from 57% to 100%

4.1.3. Set the job content of stations by ECRS: First we decomposed production process into steps, then rearranged and combined to form seven stations. In order to reduce the move, duplicate handling and change frequency, we specify the portion of the line work to support staff, while combined the adjacent work stations to form technical. The preparatory work was completed.

4.1.4. Draw the line balance map and compile standard operation procedure: After the above adjustment, we finalize the line balance map of LC0.9, the balance rate can reach 86%.

4.2. set up the streamline

4.2.1. If the balance analysis is the software part, the layout of streamline is the hardware part. The project team held meetings to discuss and collect feedback of the operators, Then designed each work station for operators. Such as the test equipment was improved tilted 45 ° placed for easy align ferrule and view screen data. The engineer designed the box groove on the countertop for easy to material handling, etc. we finalize the

drawing map for guiding the streamline manufacturing.

4.2.2. Our team make full use of production resources, borrow two belt lines from the terminal group, through the transformation and adjustment of engineers, the speed of belt line can match the beat and meet the transport requirements of the product.

Step5. Project management and results verification

5.1. Project management: during the project, the team member discussed the project progress and problems through regular meetings mainly, insisted on viewing problems and develop solutions in workshop, and fully mobilize the enthusiasm of the first-line operators to optimize the project.

5.2. Results verification: the Production engineers organized the trial production. They continuous recorded daily output, manpower hours and on-site problems and continuous monitor productivity of the benchmark line.

Step6. Continuous improvement

On the basis of trial production on the assembly line, we design work module for support staff, such as logistics module, we set someone as a water spider, written content of their daily work to form logistics module operating instructions, the assembly operator without reminders material, not pre-installed, no sorting, no self-test; test module developed for SIP (Standard Inspection Procedure)which including first-article inspection, sampling, final inspection and other inspection requirements; empathy module packaging operations will be listed separately developed POP (packaging operation procedure) and completed the work of fill whiteboard in its content. (Figure 3)

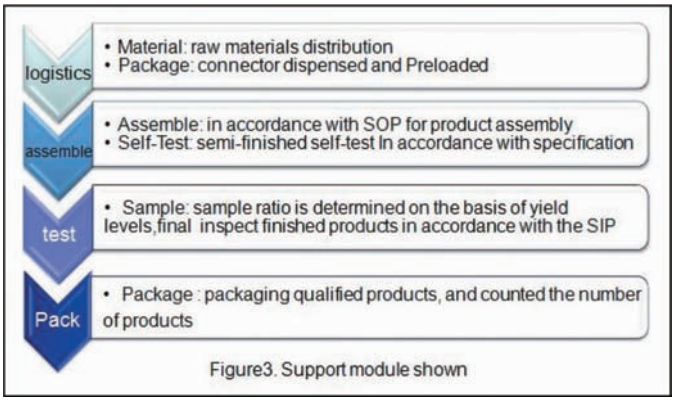

Figure3. Support module shown

We solved the waiting problem in part of stations by increasing the pre-installed of connectors in their work content to enhance their work saturation

The IT engineer installed radio frequency identification card and identification equipment in the work stations, in order to achieve data automatically, eliminate the work of fill label (be omitted)

Step7. Project summary and report

The project of streamline ran about eight months, finally reached the expected target through the joint efforts of the project team (table 1).

Table1-Indexes comparison table

#	Index	target	Before	After	Percentage	Instruction
1	UPPH	UP 15%	18	22.4	24%	units Per Hour Per Person
2	Output per unit area	UP 30%	46.3	61.7	33%	units Per Square meter(Pcs/㎡)
3	Operative Standard time	Down 10%	2.1	1.87	9%	the Total time of operatives(min)

Step8. Standardization and promotion

Our team update the database of standard time, the multiple activity operation chart, SOP, SIP and POP. Then replaced these Files in the workshop. After the first phase of the project. We will research into cells pull production system based on the characteristics of the patch cord, continue to improve production efficiency, while enhancing flexibility and rapid response capability of production system.

Thanks to the full discussion and pre-project preparation, the practical application of industrial engineering related tools, full participation, and efficient, the project team members constantly strive for excellence on the process and results, these are the key factors in the success of the project.

六西格玛方法在降低光纤生产不良中的应用

■ 战略中心　曾军

光纤是现代通信产业的基石，对民用和军事工业的发展都有重大的意义。经过三十多年的发展，原来被少数公司垄断的光纤制造技术已经普及，光纤生产技术已经成熟。随着通信网络泡沫经济的破灭，国内极度的产能过剩加上国外的倾销，国内普通单模光纤产品进入了残酷的价格大战中，光纤价格从 2000 年的 1250RMB/Km 降到目前的 50RMB/Km。光纤生产已从技术导向向成本导向转变，光纤行业进入了微利时代，为求生存，各企业都力求降低制造成本，提高质量、提高客户满意度。然而，传统的质量改进方式直接对产品高低表现做出回应，难以对过程整体的关键输入变量进行控制，容易导致改善效果不佳，或一段时间后反复。六西格玛 DMAIC 法从问题界定开始，经过绩效测量、原因分析、改进实施、控制改进，将整个过程都建立在统计分析的技术基础上，将实际问题转化为统计问题，寻找到统计上的解决方案，再由统计解决方案转化为实际的解决方案，帮助公司以科学的方式认识问题、分析问题、解决问题，达到质量更佳、效率更高和成本更低的目标。

本文以公司某光纤产品的质量改进项目为例，介绍六西格玛改进模型(DMAIC)的实施过程，验证六西格玛方法在产品质量改进中的有效性。

1.六西格玛方法简介

六西格玛是一整套管理方法，不仅指过程或产品业绩的一个统计量，更是指公司业绩改进趋于完美的一个目标，是能实现持续领先和世界级业绩的一个管理系统，是系统解决问题的方法和工具，是基于数据的一种决策方法。

上世纪八十年代末期，六西格玛最早作为一种突破性的质量管理战略在摩托罗拉公司(Motorola)制造业领域付诸实践，使产品的不合格率大幅度下降。从而在 1988 年荣膺极负盛名的马克姆波·里奇国家质量奖。随后，联信公司(Allied Signal，后与霍尼韦尔 Honeywell 合并)和别的公司在各自企业内全面推广六西格玛管理战略。通用电气公司(General Electric Company) 在杰克·韦尔奇领导的下更是把六西格玛这一高度有效的质量战略变成管理哲学和实践，且形成了一种企业文化。

六西格玛管理思想包括六西格玛改进(DMAIC)和六西格玛设计(DFSS)，前者是实施六西格玛项目最主要的方法。从统计意义上讲，一个过程具有六西格玛能力意味着过程平均值与其规格上下限线的距离分别为 6 倍标准差，此时过程波动减小，每 100 万仅有 3.4 落入规格限以外。

六西格玛改进各阶段的主要工作内容如下：

流程	内容
定义阶段	定义问题，了解课题的目的与绩效目标，并做好前置作业准备工作。
测量阶段	在流程系统中找出关键因子，并且搜集资料，确定测量指标，评估流程的能力。
分析阶段	以统计手法分析资料中的数据、变异以及变异来源，并找出问题的起因。
改进阶段	针对问题关键因子及测量分析后的建议，提出解决方案。
控制阶段	导入控制及控制计划，运用统计过程管制（SPC）、标准作业指导书（SOP）等手法，监控流程是否正确执行与持续改善。

2.六西格玛改善案例探讨

2.1 定义阶段

2.1.1 选题背景 公司生产的光纤具有多种不良缺陷，其中 417code（光纤的外径超标，>255um 或者 <235um）是反映光纤涂覆后光纤质量的重要指标之一，也是影响光纤合格率的重要因素。2013 年 417code 报废光纤市价在 600 万元以上，在现在光纤价格越来越低的市场竞争环境下，光纤的成本就凸显的愈加重要，而通过减少 417code 的报废量从而提高合格光纤效率也就成为我们急需解决的问题！

2.1.2 确定改进机会 从 2013 年下半年的数据看，417code 的报废率维持在 0.5%附近波动，进一步从拉丝过程分析（起头，拉丝中途，收尾三个阶段），对应 417code 报废情况如图 1 所示：

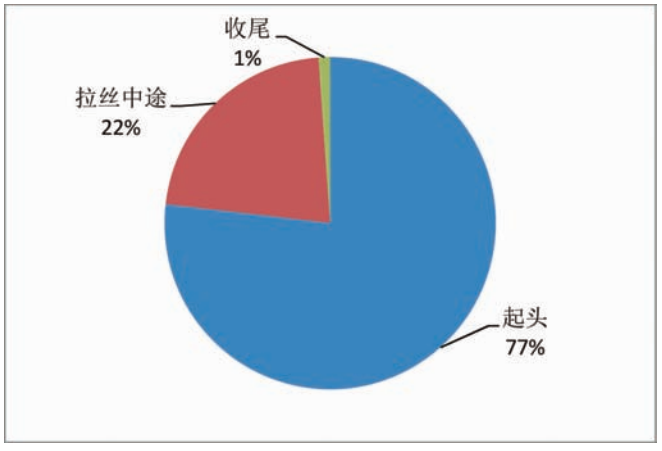

图 1 417code 不良饼图

从图 1 可知，起头阶段的 417code 报废占总的报废数的 77%，若起头 417code 能够解决 50%，则 417code 报废可降低 0.5%x77%x50%=0.2%，因而整个 417code 报废为 0.5%−0.2%=0.3%，项目组确定通过努力可以实现。

2.1.3 项目目标确定 基于 417code 报废在生产过程中的原因，将目标定为 0.3%。

2.2 测量阶段

2.2.1 确定测量指标 根据定义阶段的问题分析结果，本项目必须对拉丝起头过程中 417code 报废率（长度）进行改进和监控，故 417 报废率（长度）为本项目的关键质量特性（CTQ）。在项目中对测量系统分析包括 417code 的测量方式和 417code 测量系统准确性的评价。由于公司使用自动化程度很高的 CM5 自动监测，本项目的测量方式和测量准确性均能满足要求。

2.2.2 确定现有过程能力 确定测量系统后对 CTQ 重新收集数据，如下图：

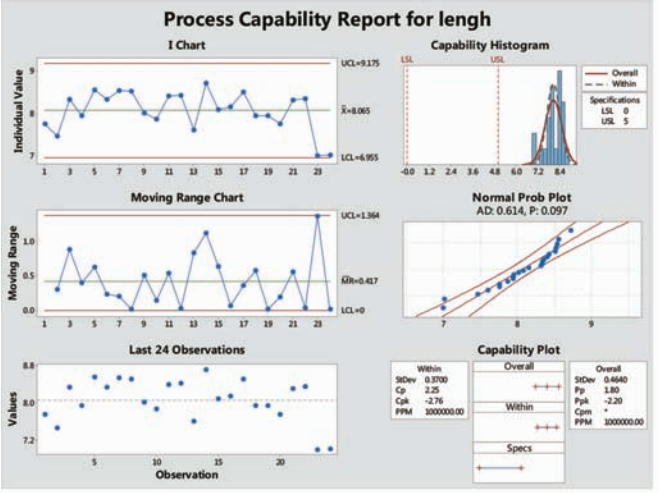

图 2 417code 报废长度过程能力分析

从图 2 分析，417code 每周报废长度受控，但平均超出了过程期望。

2.3 分析

组织团队人员进行头脑风暴，并运用高级流程图、CE 矩阵、PFMEA 等工具，对人、机、料、法、环、测六个环节进行分析，筛选出可能影响 417code 报废率（长度）的因子，形成计划表如下：

表 1 要因确认表

序号	可能关键因子
1	起头升速速率
2	Body 温度 & 压力
3	合长冷管时线速度
4	长冷管密封及热效果
5	He 开合时线速度
6	MFC 开度值
7	He 闭环时线速度
8	闭环自动与手动切换时机

逐一分析要因确认表中的各因素，进一步确定影响 417code 报废率（长度）的关键因子。

经过现场试验，运用回归对起头升速速率进行分析，结果如下：

回归方程为　length = − 651 + 7.50 time

自变量	*系数*	*系数标准误*	*T*	*P*
常量	*−650.9*	*202.8*	*−3.21*	*0.007*
time	*7.5016*	*0.3775*	*19.87*	*0.000*

S = 234.578　R−Sq = 96.8%　R−Sq（调整）= 96.6%

方差分析

来源	*自由度*	*SS*	*MS*	*F*	*P*
回归	*1*	*21728827*	*21728827*	*394.88*	*0.000*
残差误差	*13*	*715351*	*55027*		
合计	*14*	*22444178*			

从统计分析结果看，起头升速速率是影响 417code 的关键因子。

结合现场分析，运用图形、假设检验、回归分析对其它因子进行统计分析，对部分影响因子进行即时改善，不再进入下一阶段，最终确定进入下一阶段影响 417code 报废率（长度）的关键因子如下：

表 2 经确认的关键因子

序号	关键因子
1	起头升速速率
2	长冷管密封及热效果
3	MFC 开度值
4	He 开时线速度

2.4 改善阶段

2.4.1 改进计划 针对表 2 中的关键因子制定如下表 3 所示的改进方案：

表 3 关键因子解决方案

序号	关键因子	解决方案
1	起头升速速率	编写快速升速自动控制程序
2	长冷管密封及热效果	更换为新式长冷却管
3	MFC 开度值	更换为 10L MFC
4	He 开时线速度	更改系统控制程序，开 HE 与外径关联

2.4.2 改进方案实施

针对起头升速，编写快速升速自动控制程序，弥补人工操作的缺陷，措施实施后，缩短了速度升到 500m/min 的时间，长度控制在 5Km 内，对降低起头光纤外径大不良有显著贡献。针对长冷管密封及热效果，通过优化选型，最终确定长冷管类型，导入新长冷管后，改善了光纤生产的密封及热效果，起头 417code 报废长度平均减少 1.5Km。

针对 MFC 开度值，导入方案后，改善了 MFC 的精度控制，使得 He 气流更稳定，417code 报废长度平均减少 2Km。

针对 He 开时速度，重新优化自动程序，导入措施后，改善了 coating 的涂覆效果，使过程更稳定，减少了 417code 报废长度。

2.4.3 改进效果

经过改善，417code 报废率逐月下降，如图 3 所示，巩固期 417code 平均报废率下降到了 0.23%，实现了 0.3%的目标。

图 3 417code 报废率趋势图

2.5 控制阶段

2.5.1 控制计划

通过将改进措施纳入管理文件及规范，明确新的要求，保证改善成果得以保持。

2.5.2 项目收益

Application of Six Sigma Method in Reduce the nonconformity ratio of Optical Fibre Production

Strategy Centre　Zeng Jun

Optical fibre is the cornerstone for modern communication industry, it's great significance to the development of civil and military industry. With the thirty years of development, the fibre manufacturing technology have been popular, optical fibre production technology has matured. With the development of communication network, the bubble economy are burst, the domestic extreme overcapacity and foreign dumping, the domestic normal single-mode fibre products enter the brutal price war, fibre prices decreased from 1250RMB/Km in 2000 years to the current 50RMB/Km in now. Optical fibre production has been changed from technology oriented to the cost oriented, optical fibre industry has entered a low profit era, in order to survive, all enterprises are striving to reduce manufacturing costs, improve quality and customer satisfaction. However, the traditional quality improvement methods on the performance of the products directly respond to result level, it is difficult to control the overall process of key input variables, lead to the improvement effect no obvious, or repeated after a period of time. Six sigma DMAIC method started the define the problem, and then the performance measurement, cause analysis, improvement implementation, control, the whole process have established based on statistical analysis, it transform the practical problems into statistical problems, find the statistical solutions, and then transform the statistical solution into real solutions, help company to use the scientific way understand-

1)通过以上六西格玛改进法在项目中的应用,公司光纤拉丝 417code 报废率从改善前平均 0.5%降低到 0.23%(公司 9.1 期已全部导入对策,9.2 期及其它已部分导入对策,全部导入后有望控制在 0.2% 以内),自巩固期起,按 2013 年产能 2566 万芯公里(每公里 48 元)估算,巩固期已产生直接效益 100 万元以上,预计未来 12 个月将产生直接经济效益 300 万元以上。

2)在该项目的培训和开展过程中,项目团队用六西格玛科学方法武装思维,分析处理问题,使自己的思路更有层次,更具有条例性;也学会结合统计软件,通过生产中的数据,分析检查差异,找出规律,明确方向,为工艺的控制提供了合理依据;

3)理顺了改进项目开展的详细流程及使用工具,DMAIC 也成为我们日后工作生活中的重要改进方法,培养了整个项目组成员的团队合作意识,为今后更多项目的开展奠定了基础;

3.结论与展望

六西格玛管理方法在公司产品质量改进项目中的成功应用,表明六西格玛融合了现代管理技术和统计技术,有效地改进公司产品质量管理水平、改善了质量管理体系,提升了公司的竞争力,为实现公司战略目标形成有力的支撑。

六西格玛管理方法不仅可用在公司质量问题上的改进,亦可用于公司业务流程、产品开发绩效的改善。公司已经为我们搭起了这样一个平台,后续将会在更多的层面运用六西格玛管理方法。

ing the problem, analysis problem, solve problems, achieve the better quality, higher efficiency and lower cost.

This topic based on the improvement project of reducing the fibre product nonconformities, introduced the implementation process of the Six Sigma improvement model (DMAIC), to verify the effectiveness of the Six Sigma methodology in product quality improvement.

1.Introduction of Six Sigma Method

Six Sigma is a set of management methods, not only refers a statistic of process or product performance, but also refers the company performance improvement tends to perfect, is a management system to achieve sustained leading position and world-class performance, is a method and tool to solve the problem of the system, is a decision-making method based on data.

Six sigma originated in the 1980's as Motorola responded to the threat of Japanese competition which had far lower defective rates. The approach spread to AlliedSignal and to General Electric, whose Chief Executive Officer, Jack Welch, has been the most passionate advocate of Six Sigma. Since introducing it worldwide in 1996, GE has made over $1 billion of cost savings. Six Sigma method includes six sigma improvement (DMAIC) and design for six sigma (DFSS), the former is the main method of implementing Six Sigma project. Statistically speaking, a process with six sigma capability means the distance between the average of the process and its specifications were the 6 times the standard deviation of this process, and each of the 1000000 opportunities, only 3.4 fall outside the specification limits.

Six sigma improvement each stage are as follows:

stage	content
Define	Defining the problem, and understanding the performance target of the subject
Measure	Measure the process to determine current performance
Analyze	Analyze and determine the root cause(s) of the defects
Improve	Improve the process by eliminating defects
Control	Control future process performance

2. Studying the case of six sigma improvement project

2.1 Define stage

2.1.1 Project Background

Optical fibre product process bring various defects, the 417code (beyond the spec., the outer diameter greater than 255um or less than 235um) is one of the important indicators, and reflect the quality of coating, which are important factors which influence the fibre yield rate. More than six million of the discarded products because of the 417code defect in 2013, now the optical fibre prices are getting lower and lower, the cost of fibre become more and more important with the market competition environment, through reducing the amount of 417code to improve the quality has become our urgent problems!

2.1.2 Identify opportunities of improvement

From the second half of 2013, 417code nonconformity rate remained around 0.5%, further from the process analysis (start, drawing the midway, the end), the three stages of the corresponding 417code are as shown in figure 1:

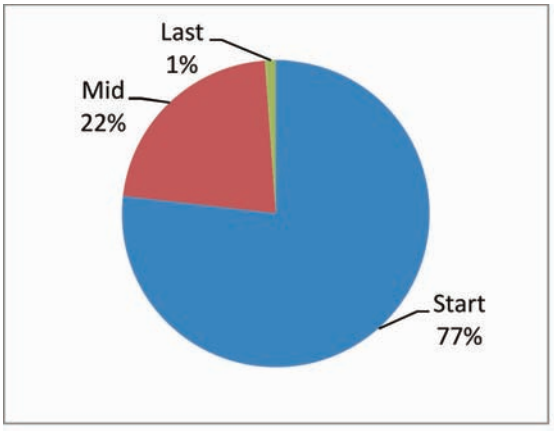

Figure 1: 417code pie chart

Figure 1 shows the start stages of 417code accounted for the total number of 77%, if solve the start of 50% 417code, 417code could reduce the 0.5%x77%x50%=0.2%, so the 417code will be 0.5% –0.2% =0.3%, the result can achieve through the project team efforts.

2.1.3 Project goal

Base on the cause of the production process, the 417code target is determined as 0.3%.

2.2 Measure stage

2.2.1 Ensure measuring index

According to the problem analysis result of the definition phase, the project must monitor and control the start of drawing process, so the 417code nonconformity rate (length) as the key quality characteristics of the project (CTQ). we analyze and evaluate the accuracy of measuring methods including 417code and 417code measurement system on the measuring system. The company uses a high degree of automation of CM5 automatic monitoring, measurement accuracy and measurement mode of

the project can meet the requirements.

2.2.2 Confirm the process capability

After confirmed the MSA on CTQ, collected data and shown in the following figure 2.:

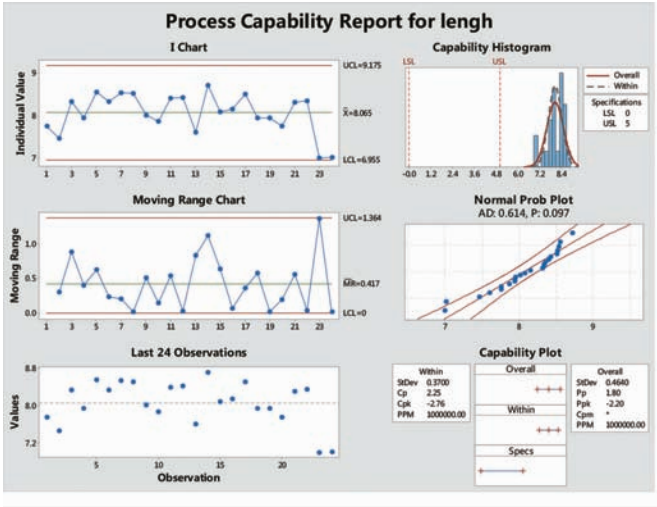

Figure 2: 417code capability analysis

Figure 2 indicates the 417code is controlled by week, but the average exceeded the process expectations.

2.3 Analyze stage

Using the advanced flow chart, CE matrix, PFMEA and combine the team brainstorming, through the analysis of the six part, human, machine, material, method, measurement, screening out the possible factor of 417code, as follows:

Table 1: the factor confirmation form

#	possible factor
1	Speed rise rate of start
2	Body temperature & pressure
3	Line speed when closing the long cold tube
4	Sealing effect of long cold tube
5	Line speed when opening the He
6	MFC switching accuracy
7	Line speed when closing the He
8	Closed loop switching time for automatic and manual

Analysis the confirmation factor in the table 1 one by one, further to determine the key factor effected 417code.

Through the real field tests, using regression analysis to analyze the speed rise rate of start, the results are as follows:

Regression Equation length = – 651 + 7.50 time

Term Coef SE Coef T P

Constant –650.9 202.8 –3.21 0.007

time 7.5016 0.3775 19.87 0.000

S = 234.578 R–Sq = 96.8% R–Sq(adj) = 96.6%

Analysis of variance

Source DF SS MS F P

Regression 1 21728827 21728827 394.88 0.000

Error 13 715351 55027

Total 14 22444178

From the statistical analysis, the speed rise rate of is the key factor to affect the 417code.

Through the real field test analysis, using graphics, hypothesis testing, regression analysis to analysis of other factors, we carry on the instant improvement on the part of impact factor, not to enter the next stage, finally determined the key important factor to enter the next stage, as following:

Table 2: confirmed the key factor

#	Key factor
1	Speed rise rate of start
2	Sealing effect of long cold tube
3	MFC switching accuracy
4	Line speed when opening the He

2.4 Improve stage

2.4.1 Improvement planning

Making improvement solution are shown in Table 3 base on the key factor in Table 2.

Table 3: key factor solutions

#	Key factor	solution
1	Speed rise rate of start	Program speed rise automatic control program
2	Sealing effect of long cold tube	Replace the long cold tube
3	MFC switching accuracy	Replace the MFC
4	Line speed at opening the He	Change the control system program, open He synchron the outer diameter

2.4.2 Implementation improve solutions

The point at speed rise rate of start, we program a fast rising speed automatic control procedure, remedy the defects of manual operation. After the implementation of the measures, shortening the time for the speed rise to 500m/min, fibre length is

controlled in the range of 5Km, we achieve the remarkable effectiveness to reduce the defect rate of the 417code.

To the sealing effect of long cold tube, we introduce the new type of tube through the optimization design. The new tube improved the sealing effect, which reduce the defect length for over 1.5Km.

To the MFC opening accuracy, introducing the new MFC to improve the control precision of MFC, which makes the He flux is more stable, reduce the average defect length for 2Km.

To the line speed at opening He, we optimize the automatic programs, that improve the coating effect, make the process more stable, reduce the length of 417code.

2.4.3 Improvement effect

After improving, 417code defect rate declined month by month, be shown in Figure 3, the average defect rate of 417code dropped to 0.23% at period of consolidation, to achieve the objective 0.3%.

#	Key factor	solution
1	Speed rise rate of start	Program speed rise automatic control program
2	Sealing effect of long cold tube	Replace the long cold tube
3	MFC switching accuracy	Replace the MFC
4	Line speed at opening the He	Change the control system program, open He synchron the outer diameter

Figure 3: 417code trend chart

2.5 Control Stage

2.5.1 Control planning

To ensure the achievement of improvement can be maintained, we write the improved solutions into the management of documents and regulations, define the new requirements,

2.5.2 Project profit

1)After using Six Sigma DMAIC in the project of 417code, the average defect rate decreased from 0.5% to 0.23%. The project has made a profit of over ￥1 million, the project would made a profit over ￥3 million in the next 12 months base on the yield of 2013.

2)In the training and implementing of project, project team armed their thinking with six sigma scientific method , using them to analysis the question, make their ideas more stratified and more regulations, and then combined with statistical software, to analysis the differences, find out the rules, clear the direction, so as to provides the reasonable control spec..

3)Project team grasped the detailed process and tools for Six Sigma DMAIC, which has also become our work habit and methods in the future life, and cultivated the consciousness of team cooperation, which laid the foundation for the other projects in the future.

3. Conclusion and Prospect

Six Sigma management methods succeed in the application of the product quality improvement, showed that Six Sigma integrated into modern management techniques and statistical techniques, effectively improved the quality management level, improved the quality management system, enhanced the competitiveness of the company, and formed a strong support for the realization of the strategic objectives.

Six Sigma management methods not only can be used in the quality issue improvement, can also be used in business process improvement, product development performance improvement. Now the platform has set up for us, we could apply Six Sigma management method in more fields.

热干面

一城一味

制造中心　曾云飞

每座城市都有自己独特的坐标，不仅仅是文化，还包括饮食，可以说是一城有一味。提起成都的小吃，绕不开担担面和麻辣味；说起北京的经典小吃，那就离不开炸酱面和北京烤鸭；谈起天津的特色小食，当然不能不讲狗不理包子和麻花。要品尝汉味，热干面和鸭脖子会即刻闪现在脑海，而相比鸭脖子，武汉人对热干面的感情可能要更深。

热干面的诞生，完全是个偶然事件。20 世纪 30 年代初期，汉口长堤街有个名叫李包的食贩，在关帝庙一带靠卖凉粉和汤面为生。有一天，天气异常炎热，不少剩面未卖完，他怕面条发馊变质，便将剩面煮熟沥干，晾在案板上。一不小心，碰倒案上的油壶，麻油泼在面条上。李包见状，无可奈何，只好将面条用油拌匀重新晾放。第二天早上，李包将拌油的熟面条放在沸水里稍烫，捞起沥干入碗，然后加上卖凉粉用的调料，弄得热气腾腾，香气四溢。人们争相购买，吃得津津有味。有人问他卖的是什么面，他脱口而出，说是“热干面”。热干面由此诞生。

经过几十年的传承和推广，热干面早已成为武汉饮食的象征，并且形成了自身的特色。热干面与北京的炸酱面、山西的刀削面、四川担担面同称为中国四大名面，这也间接地说明了热干面的影响力。热干面是武汉人过早的首选小吃，而“过早”一词恐怕也是武汉人对于早点能诠释出的最精粹的词语。武汉人对于“过早”对于“热干面”的感情，就不必再多说。热干面对武汉人或者在武汉呆过一段时间的朋友来说，它不再仅是一种小吃，而是一种情怀，未食而乡情浓浓，食之则香气喷喷。

在武汉街头巷尾，在清晨的阳光普照大地迎来新的一天时，当你看到一位穿着时尚的女白领踩着高跟鞋一路小跑追赶公交时，当你看到一身运动的小年轻带着耳机穿梭在地铁站时，当你看到朝气蓬勃的学生背着书包前往学校时，当你看到广场舞的大妈神采飞扬的袖舞长空时，不要因为他们的手中都端着一碗热腾腾的热干面而投去异样的眼光。也许这就好像池莉笔下的《生活秀》里武汉人的精神吧：“干练，精明，讲胃口！”全新的大武汉正用“敢为人先，最求卓越”来迎接她的华丽蜕变和伟大复兴！

One City with One Flavor

Manufacturing Centre Zeng Yunfei

Every city has its own unique symbol, not only including culture but also food. It is said that each city owns a flavor. Speaking of snacks in Chengdu, we will think of spicy noodles; in Beijing, noodles with bean paste and Peking duck are classical; in Tianjin, Goubuli Steamed Bun and Fried Dough Twists is a must. While, if you want to taste the true flavor in Wuhan, Hot noodles with sesame paste and spicy duck necks will occur to your mind. However, compared with later, Wuhaners may have deeper love for the hot noodles with sesame paste.

The occurrence of hot noodles with sesame paste is accidental. In the early 1930s, there is a food vendor named Li Bao in Changdi Street in Hankou, who earns a living on selling noodles in Guandi temple. On day, it is very hot and many noodles are left, for fear of the noodles turning rancid, Li boils all the noodles and air-dries them on the board. Carelessly, the oil bottle on the board is knocked and the oil spills on the noodles. Li can do nothing but stir the oil with noodles. On the next morning, Li boils these cooked noodles and puts them to the bowl and then adds some condiment to make them scented. People are eager to buy and eat happily. When someone asks what kind of noodle he sells, he blurts "hot noodles with sesame paste". Then that is the origin of it.

After decades of inheriting and marketing, hot noodles with sesame paste has become a symbolic food of Wuhan and formed its own features. Being one of four great noodles in china, including noodles with bean paste in Beijing, sliced noodles in Shanxi, spicy noodles in Sichuan, it shows its great influence. A hot noodle with sesame paste is the first choice for Wuhaners for their breakfast. Both "having breakfast" and "hot noodles with sesame paste" play special roles in Wuhaners. For Wuhaners or people who stay a while in Wuhan, the noodles are not only a kind of snack but also a kind of feeling: not having it, we feels nostalgic, having it, we feel fragrant.

In Wuhan, when the first sunshine welcomes a new day, when you see a fashion white-collar with high heels running after a bus, when you see a young sport teenager with earphone walking through the subway, when you see a lively student with school bag heading for school, when you see grandmas dancing with their sleeves high, please don't caste strange look at them because of their hands holding a bowl of hot noodles. Maybe this is the spirit of Wuhaners described by the writer Chi Li in her "Life Show": capable, smart, and appetite". The new Wuhan is welcoming her gorgeous transformation and great rejuvenation by "Dare to be the first, aim for the excellence."

Translated by Li Jianghong

长飞公司举办第一届 YOFC First

■ 制造中心　梁博

2014 年 12 月 6 日，长飞光纤光缆股份有限公司“第一届密室逃脱比赛”在光谷时代广场塔卡超级密室开赛。比赛由公司工会、团委和战略中心共同主办，共有光纤队、光缆队、预制棒队、特种产品队、研发中心队、职能中心队 6 支队伍参赛，时长为 1 个小时。

本次比赛旨在通过密室逃脱活动的形式，为公司员工提供一个相互了解的平台。通过活动，进一步提高员工对活动的兴趣，让员工在短时间内从陌生到熟悉，培养同事之间的默契，提高沟通的能力，激发团队合作能力，提升企业凝聚力和向心力。

团队的合作，是为了达到既定的目标所显现出来的一种自愿合作和协作努力的精神，真正的合作是以“心甘情愿”为基础。当团队的合作是出于一种自身的自愿时，它必将产生一种无形而又持久强大的力量，可以调动所有成员资源和才智，此无形力量胜于有形。在比赛中，各参赛队伍紧密合作，将团队合作展现的淋漓尽致。

通过这次活动，坚信我们这个团体，今后在共事的时候，会更好地利用团队力量，为建设长飞公司一片新天地而努力奋斗！

密室逃脱比赛
Room Escape Game

Manufacturing Centre Liang Bo

On December 6th, 2014, YOFC First Room Escape Game was held in Kata XRoom of Optical Valley Times Square. This one-hour game is co-hosted by company Labor Union, Youth League Committee and Strategy Center, participated by 6 teams, including fiber team, cable team, preform team, special product team, R&D center team and function center team.

The competition aims to provide a platform for mutual understanding in the form of room escape activity. The activity can further increase employees' interest in it, so that they will be familiar with each other shortly to develop harmonious relationship, improve communication ability, and thus inspire teamwork, enhance cohesion and solidarity.

Teamwork, the spirit of voluntary cooperation and collaboration showed out in the efforts to achieve the set goals, is based on true willingness. When the team work is out of voluntary, it will produce an invisible and endurable power, which can mobilize the resources and talents of all members, more powerful than the tangible. In the game, all teams work closely, showing teamwork the most.

Through this activity, it is believed that our group will make the best use of team strength in future work, to work hard and further expand new horizons for YOFC!

体育拼搏人生 精彩一触即发

——长飞公司第五届青年篮球比赛小记

■ 特种产品事业部 毛玲

为了进一步丰富员工的文化生活，以快乐体育为基础，增强员工的身体素质 ，加强员工之间的交流与凝聚力。由公司工会、团委和战略中心共同举办的长飞公司第五届青年篮球比赛，在各个部门领导的支持和团委干事以及微信宣传组的大力帮助下，经过为期三周的精彩比拼，于 2014 年 12 月 13 号圆满结束！

本次比赛是由在公司范围内的预制棒队、光纤队、光缆队、特产队、研发队和职能中心队六个参赛队组成，为确保此次篮球比赛的顺利进行，保证比赛的公平、公正性，所有比赛分组全由抽签决定。同时我们在比赛前特别选用了认真负责的专业裁判让结果更加精确。

通过球员们在篮球场上挥洒着汗水、紧张的角逐，最终产生了冠亚季军，分别由光纤队、光缆队、中心队依次获得。

有过程才会有结果，有奋斗就会有收获。无论是胜是败、是强是弱，只要我们努力奋斗过，经历了这样一段有意义的过程就是最大的收获，篮球比赛的目的不仅仅是锻炼身体，是更好的让我们懂的团结一心的含义。所以，无论是场上的选手，后场替补的选手还是撕破喉咙助威的拉拉队员们，都展现了咱们长飞公司员工团结一心的一面。

Sport Promotes the Life Makes More Colorful

——Note for the YOFC'S 5th Youth Basketball Match

Special Product Department MaoLing

To rich employee's cultural life, enhance fitness and strengthen c ooperation, the YOFC'S 5th Youth Basketball Match was organized by company's Labor Union, Youth League Commit–tee and Strategy Center. On the support of each department leader and Weixin propaganda group, the match has successfully finished on 13th December, 2014 after 3 weeks intense competition.

Totally Six teams attended the match, there were Preform Team, Fibre Team, Cable Team, Specialty Team, R&D Team and Function Centre Team.

In the match, all the teams were grouped by ballot to ensure fairness and impartiality. At the same time, professional referees were arranged in the match to make the result more accurate.

Sweating, fierce struggle, the Fibre Team finally won the champion by defeating the other competitors, Cable team and Function Centre Team ranked 2nd and 3rd.

Where there is an effort, there will be a harvest. No matter it is win or loss, strong or weak, it's the biggest harvest after going through such a significant process, and go beyond yourself. Exercise is not only the purpose of the basketball match, but also to let us understand the meaning of solidarity. So, whether the players, alternatives or cheerleaders, all staff in the game had showed the YOFC's teamwork spirit. Translated by Huang Ting

长飞公司第二届电竞比赛落幕

制造中心　张流

为了推动电子竞技发展，丰富员工休闲生活、促进员工之间的沟通了解，增强团队作战能力。2014 年 12 月 14 日，公司工会、团委和战略中心在光谷步行街乔巴网咖举办了“长飞光纤光缆股份有限公司第二届电子竞技大赛”，比赛项目分别为：DOTA、CS1.6 以及英雄联盟三大热门竞技游戏。经过 5 小时的精彩比拼，终于完美落下帷幕。

本次比赛由公司全体员工自由组合，所有参赛队以 5 人为一个团队参加比赛，每个团队由 1 名队长及 4 名队员组成。这不仅仅是一场对游戏操作技能的考验，更是对团队协作和思维能力的提高。最后三项比赛的冠军均为光缆部的三个团队获得。

团队的气氛很重要。每一个人都要能坦诚相待，都要有一份奉献精神，个人的能力肯定会得到大大的提升。大家把团队里面其他人的优点、长处都变为自己的，并加以灵活运用，不仅团队的力量日益强大，自己的能力，潜力的也得到了升华。

通过这次活动，相信公司员工今后的工作中能利用好团队的力量，推动企业发展，让每个人都能享受光纤通信带来的自由与快乐。

YOFC's the 2nd E-sports Game Ended

Manufacturing Centre Zhang Liu

In order to promote the electronic sports development, enrich staff leisure life, promote communication between staffs, enhance team work ability, YOFC's the 2nd E-sports game was held by The company union, Youth League Communist and Strategic center in Qiaoba cybercafes on Optics Valley pedestrian street on 14 Dec of 2014. The contest includes DOTA, CS1.6 and hero alliance 3. The competition ended successfully through 5 hours of exciting game.

Each team member of contest consists of 1 members of the captain and 4 players, all members are free combination by competitors. This is not just a test to the member's skills, but also to improve the team cooperation and thinking ability. The final champions of these three games were received by cable team.

The team atmosphere is very important. Everyone must be honest and a spirit of dedication to the team, of course the personal ability will greatly enhance the competition capacity. The member's individual advantage becomes the team's, not only the strength of the team becomes more powerful, but their own potential ability are also get a high level.

Through this activity, I believe the company employees are able to take the advantage of the team strength. Promote the company development so that everyone can enjoy the free and happiness through optical communication. Translated by Huang Ting

长飞好声音 音悦长飞人

——第三届“长飞好声音”比赛小记

■ 制造中心　江巍

每个人都有自己梦想的舞台，都渴望展现自己的才华，我们长飞人也一样，所以我们需要这样一个舞台，而这个舞台——长飞公司“长飞好声音”比赛——由公司工会、团委和战略中心共同搭建。“长飞好声音”比赛在经历了两个赛季后，终于来到了第三个赛季。

第三届“长飞好声音”赛程从 2014 年 3 月到 12 月，历时 9 个月。在这段时间时间里，我们共设置了 20 多场比赛，赛程涉及到各中心、各部门、每个班级及个人，可以说是得到了所有长飞人的积极参与，真正地做到了“长飞好声音”！

“长飞好声音”比赛从来都是人才辈出，第一届“好声音长飞”比赛冠军——制造中心光缆部的王欣，第二届“长飞好声音”比赛冠军——制造中心光纤部的黄星，他们都在长飞春晚上有很好的表现，在更大的舞台上展示了风采。本届比赛，制造中心光缆部的张流通过一首《恋爱 ING》，以唱跳的方式表达了长飞人积极向上的精神面貌，获得了评委老师的一致好评，最终获得了第三届“长飞好声音”的冠军。

本届“长飞好声音”比赛还涌现了一批实力很强的选手，亚军——制造中心特种产品部的郑林，季军——制造中心光缆部的王欣，优秀奖的选手也表现不俗，他们是：童剑秋，宫贺，黄星，陈邝森，毛玲，史文婷，廖晓强，毛德润，他们一起组成了本届“长飞好声音”比赛的十强。他们携手参加了工会及团委选送的长飞公司羊年春晚节目，他们的优秀表现得到了大家的一致认可。

在“长飞好声音”的舞台上，有人拿到了名次，有人没能参加最后的决赛，但他们中间没有失败者，因为他们都是优秀的长飞人。只要你心怀梦想，对自己有信心，我们热烈欢迎您与我们共同期待第四届“长飞好声音”比赛！“长飞好声音 音悦长飞人”！

Voice of YOFC and Music Pleases YOFC People

——A Brief Report of the Third Voice of YOFC

Manufacturing Centre Jiang Wei

Everyone has his own dream and is eager to show his talent. So do our YOFC people. Therefore, we need a stage. "Voice of YOFC" match was organized by Trade Union, Youth Communist League and Strategic Center. It came to the third season after experiencing two seasons.

The third "Voice of YOFC" race was from March to Dec. 2014, last for nine months. We offered over twenty competitions during the period which involves each center, department, shift and individual. All YOFC people actively participated in the race. We can say it's really a "Voice of YOFC".

Each "Voice of YOFC" competition is from talented people's participation. The champion of the first "Voice of YOFC" Wang Xin is from Cable Department, MC, and the champion of the second "Voice of YOFC" Huang Xing is from Fibre Department, MC. They had good performance in YOFC Spring Festival Gala and showed their appearance in the greater stage. Zhang Liu, Cable Department, MC showed YOFC people's positive mental outlook with singing and dancing, winning favorable comment from judges and finally was awarded the title of champion of the third "Voice of YOFC".

Some strong competitors emerged in the "Voice of YOFC" competition. Zheng Lin, Specialty Product Dept. MC, won second place and Wang Xin, Cable Dept. MC, got a third. The competitors winning excellent prizes also had good performance. They are the following: Tong Jianqiu, Gong He, Huang Xing, Chen Kuangsen, Mao Ling, Shi Wenting, Liao Xiaoqiang and Mao Derun. All of them formed ten strong competitors of "Voice of YOFC" competition. They joined in the YOFC's Spring Festival Evening Programs, which had been selected by Trade Union and Youth League Committee. Their good performance won everyone's approval.

Someone wins places while some others do not enter the finals, but they are not losers because they are all excellent YOFC people in the stage of "Voice of YOFC". As long as you have dream and confidence, we warmly welcome you, looking forward to the fourth match of "Voice of YOFC". "Voice of YOFC and Music Pleases YOFC People".

Translated by Zhao Xuan

2015 年“奔跑吧!

2015 “Running YOFC”

■ 本刊编辑部 /The Editorial

欢快的舞蹈、飘逸的舞裙、搞笑的三句半、动听的歌曲……2 月 13 日晚 7 点，长飞公司 2015 年“奔跑吧！长飞”春节联欢晚会在武汉科技会展中心隆重举行，整台晚会包含歌曲、舞蹈、三句半、戏曲等节目，形式多样，精彩纷呈。一个个精彩的节目，引来观众席中阵阵欢呼声。其中的戏曲川剧变脸、舞蹈《甜心轰炸机》等节目，更是给现场观众带来了强烈的视觉冲击。

晚会正式开始前，公司总裁庄丹先生与第一副总裁扬·帮卡先生合唱了一曲著名英文歌曲《You Are My Sunshine》。动情的演唱博得阵阵掌声，也使得晚会还未开始便已点燃了现场观众的热情。开场舞《喜气洋洋》虽然姗姗来迟，却让现场的气氛热烈依旧，舞蹈《长绸飞扬》、歌曲《恋爱 ING》、舞蹈《斗牛士舞》的表演将现场烘托成欢乐的海洋。

演出的第一个小高潮来自于舞蹈《小苹果贺新春》，表演者是一群稚气未脱的小朋友，他们将去年响彻华夏的神曲《小苹果》来了一次彻底的改编，用天真无邪的表演表达了对新春和长飞公司上市的美好祝福。著名歌手巴桑朗杰两首藏族歌曲的演唱，让晚会多了几分专业性，双簧、歌舞《黄种人》也是不遑多让，现场观众不时送去掌声。

一个节目的精彩，并不能衬托整台晚会，2015 年春晚就是力争做到每个节目有亮点、高潮不断，将晚会推向另一个高潮的节目正是戏曲串烧，尤其让观众沸腾的节目正是川剧变脸。原本只能在电视上欣赏到的精彩表演，如今搬到了长飞春晚的舞台上，现场观众难掩兴奋之情，欢呼声此起彼伏。乐队弹唱的歌曲串烧《长梦飞歌》、三句半《供应链拜年》无不让观众大呼过瘾，三句半质朴、幽默的语言更是让人感受到了长飞人诚挚的爱厂之心。

伴随着独舞《卷珠帘》、歌曲《You Raise Me Up》等节目的一一表演，晚会逐渐进入尾声，舞蹈《甜心轰炸机》掀起了晚会的最后一个高潮，一个个穿着性感的男演员反串表演，他们的投入引得全场哄堂大笑。最后，晚会在合唱《奔跑吧长飞》美妙的歌声中落幕。

长飞”春节联欢晚会

Spring Festival Gala Evening

Joyous dances, graceful dress, funny cross talk and melliflu-ous songs..... “2015 Running YOFC” Spring Festival Gala Evening was ceremoniously held in 19:00 p.m. on Feb. 13th, 2015 in Wuhan Science and Technology Convention and Exhibi-tion Center. The whole evening party includes songs, dances, cross talks, and traditional opera, etc. Its diversified forms and wonderful programs attracted cheers.

CEO Zhuang Dan and the first deputy general manager Jan. Bongaerts sang a famous English song “You Are My Sunshine” in chorus before the evening party had formally began. The emo-tional singing won round after round of enthusiastic applause to make audiences passionate. Although the opening dance “Hap-piness” was late, the atmosphere of the scene was still warm. The performances of “Long Silk Rises” dancing, “Loving” song and “Matador” dancing presented the scene to the joyous sea.

The first little climax of the performance was from the “Little Apple Greets New Year” and the performers were children. They made a thorough adaptation of the divine tune “Little Apple” which had been popular last year to express their good wishes to the spring and YOFC’s IPO with innocent performance. Two Ti-betan songs from a famous singer made the evening party more professional. A two-man comic show, song and dance “Yellow Race” received warm applause.

A splendid program cannot set the whole evening party off to advantage. We try to make each program luminous and keep constant climax in 2015 Spring Festival Gala Evening. The mixture operas pushed the evening party to the other climax. The Sichuan Opera made the audiences exciting. The wonderful pro-gram which we had originally watched on TV was performed on YOFC Spring Festival Evening’s stage. The audiences’ cheers rose one after another. The band played guitar and sang the song of “YOFC’s dream” and cross talk “People from the Sup-ply Chain Dept. Pay New Year Calls” satisfied audiences. The humorous language made us feel YOFC people’s sincere heart for the factory.

The evening party gradually came to an end with the perfor-mance of the solo dance of “Rolling Curtain” and the song of “You Raise Me Up”, etc. “Honey Bomber” brought the evening party to a final climax. Some sexy actors reversed performance and their devotion caused a general outbreak of laughter. The evening party finished successfully in the great chorus of “Run-ning YOFC”.

Translated by Zhao Xuan


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