

Standard Working Hours and Efficiency Improvement Best Practices

Shanghai, China

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Consultant:

Eric Zhang, Senior engineer, Master degree of Dongnan University.

21 years of work experience, worked as engineering, quality, production logistics manager position, has nearly 10 years of management experience. He had been to Sweden head office and branch companies in the United States, Germany, Sweden, Malaysia, India and others to do industrial engineering (IE), logistics packaging design, lean manufacturing and six sigma technology exchange and training.

Training Style: Worked for 21 years, foreign enterprise (a state-owned enterprises, a foreign company, both are very large enterprises) engineering, quality, materials management departments work experience, has rich lean manufacturing, industrial engineering (IE) technology, transportation and packaging design, quality management, material and storage management working experience; Proficient in industrial engineering, lean production, lean value stream analysis, logistics packaging design, plant lean layout and logistics path design, warehouse management, 6 Sigma, etc.

His lecture advocate pragmatic. Training process mainly use curriculum system as the main line, through case study, role simulation exercises, group discussion, work practice and at the same time accompanied by consulting type training, guide the student to participate in, and focus on its rich enterprise practice to improve case sharing.

Typical clients: Abbott, Huayang - Kostal, Siemens, Shanghai Johnson, Harbin beer, Toshiba transformer company, Dongfeng motor, Cummins engine, Simon Electric, Continental Automotive Electronics, Midea Group, Geishite Pharmaceutical, Kraft Foods, Beijing Bowei Airport Support, Futian Automobile, Yongkang Pharmaceutical, Panhan Power Generation, Yibin Paper, Bohai NKK, Zhejiang Mobile, Jinbo Agrochemical, Nuokang medicine, Hankook Tires, United Automotive Electric System, Lafarge, Alfa Laval, Suntory etc.



Who Should Attend?

Process engineer, lean manufacturing engineer, IE engineer, production supervisor, production manager, engineering manager, human resources managers, etc.

Seminar Objectives:

Through this seminar, master:

- The significance of standardization work to standard working hours, how to develop standardized work.
- Standard working hours structure, measurement method, influencing factors, steps to develop, margin rate and the improvement of the standard working hours.
- Work quota, the influence factors of production performance and improvement.

Help enterprises to establish a scientific standard working hours, and set reasonable work quota, provides data base for the enterprise to reasonably evaluate staff performance, and provides the methods to improve the efficiency of system. Seminar interspersed with a lot of discussions, practices and cases.

Seminar form:

Combine the production practice knowledge, easy to understand, easy to master the knowledge points. With case presentation and explanation, practice, help learners to apply knowledge to enterprise's production practice and project improvement. Make scientific knowledge into real productive forces. Come with group discussion, interaction, inspiration from game, brainstorm, emphasis on student participation.

In-House Training Solutions

If you have a number of delegates with similar training needs, then you may wish to consider having an In-House Training solution delivered locally on-site. Course can be tailored to specific requirements. Please contact **Whitney Shen** on **+86 28 8532 7678** or email whitney.shen@martinlinking.net to discuss further possibilities.

Section 1: Composition of standard working hours

- ✧ Time study

Game 1: Poker games lead to consideration of standard working hours

- ✧ The definition of standard working hours
 - ◆ Basic conditions of standard working hours
 - Qualified workers
 - Operation standard
 - Normal environment and conditions
 - General proficiency and normal speed

Note: measurement of standard working hours must pay attention to the above four elements.

Discussion 1: According to the definition, how to calculate standard working hours in the game?

Discussion 2: Is the standard working hours in your enterprise met with the requirement? How to improve?

- ✧ Study the level of time
 - ◆ Action (for action intensive type)
 - ◆ Work elements - set of a number of actions
 - ◆ Operation - set of a number of work elements
 - ◆ Program - job list need to complete a job
 - ◆ Activities - process needed to complete a job, is made up of several programs or workstations
 - ◆ Functions - a product components or parts, ensure all activities necessary to achieve a particular purpose
 - ◆ Product - complete the final product

In the determination of standard working hours, choose the appropriate measurement level depending on the complexity of the job, not by rigid practices.

Discussion 3: What level of working hours is appropriate to measure in your company?

- ✧ Composition of standard working hours
 - ◆ Precise time
 - Main operation time
 - Target operation (Main job)
 - Subsidiary operation
 - Such as inspection, measuring, machine operation time and so on
 - Preparation operation time:
 - Such as Exchange of Die time
 - Preparation work
 - Initial waiting of next process after Exchange of Die
 - ◆ Spare time
 - Human-induced spare time
 - Personal affair spare time (drinking, wiping sweat etc.)
 - Fatigue spare time
 - Other spare time
 - Operation spare time (Quality problem handling)
 - Factory spare time (5S、morning assembly)

- ✧ Time classification
 - ◆ Attendance time
 - ◆ Specified rest / dining time
 - ◆ Effective work time
 - ◆ Loss of time and elimination
 - Proficiency
 - Quality loss (raw material, defective goods)
 - Equipment downtime
 - Waiting (material、 machine etc.)
 - Operating method

- ✧ Classification of standard working hours
 - ◆ Labor hour
 - ◆ Machine hour

Note: If productivity is determined by the machine-hour capacity, the machine is set to be the bottleneck.

- ◆ Simply introduces the man-machine collaboration - improve the efficiency of collaboration

Case 1: Man-machine collaboration to improve

Case 2: Assembly line layout

Reference : Margin type and margin rate reference standard

Discussion 4: What spare time types exist in your enterprise, which is shared by a product standard working hours or removed from the work time?

Discussion 5: What preparation work time exist in your enterprise? Whether can eliminate or reduce part of them? How to do?

- ✧ Standard working hours setting steps and matters needing attention
 - Eight steps to set standard working hours
 - Main points to measure standard working hours
- ✧ Direct employees and indirect employee's working hours
 - The division of direct employees and indirect employees
 - Material staff / production coordinator / shift supervisor
 - Team leader / technical support
 - How does indirect employees share standard working hours
 - Share standard working hours (not recommended)
 - Spread into the cost of production (recommended)

Discussion 6: What types of direct and indirect personnel exist in the enterprise, how to fix number of persons and posts for indirect staff, how to consider their standard working hours?

Section 2 Measurement of standard working hours

- ✧ Direct observation method
 - ◆ Stopwatch chronometry
 - ◆ Camera method – need to eliminate the waste of time

- ◆ Work sampling method
- ◆ Realistic working day

Case 3: Work sampling method of a household electrical appliance factory

Case 4: A realistic factory working day

- ✧ Synthesis method
 - ◆ Predetermined Time Standards - PTS
 - Work factor method
 - Method of time measurement
 - Modular Arrangement of PTS - MODAPTS (key)
- ✧ Motion analysis and MODAPTS
 - ◆ The meaning of motion analysis
 - ◆ Subtle Motion analysis
 - Motion analysis of Therblig symbols
 - Therblig motion analysis case
 - ◆ Principle of motion economy
 - Economic principle of motion
 - The economic principle of motion constraints
 - The basic principles of motion improvement
 - ◆ MODAPTS introduction
 - Characteristics of MODAPTS
 - MODAPTS compared with other PTS
 - MODAPTS and economic analysis
 - ◆ MODAPTS method main motion category analysis
 - Move motion explanation - M0 - M5
 - End action explanation - G, P class motion
 - Other body motion explanation - weight, footwork, vision, judgment, etc.
 - ◆ MODAPTS method application
 - Time analysis of motion intensive manufacturing process
 - Production location layout and design

Exercise 1: Use MODAPTS method to calculate the standard working hours of a given job

- ✧ Standard material method
 - ◆ Standard material method based on child parts
 - ◆ Standard material method based on child process
 - ◆ Standard material method based on operation
 - ◆ Application of standard material method under the customer demand diversification - calculation standard working hours
- ✧ **Software measuring standard working hours - AVIX (advanced)**
- ✧ Comparison of several kinds of standard working hours measuring methods
- ✧ Job elements statistics and people type of process program analysis

Exercise 2: Application of job elements table in working hours measuring.

Practice 3: Application of people type of process program s table in working hours measuring.

Exercise 4: choose the production line or operation process, using the above methods to practice measuring and standard working hours. Pay attention to work division and measurement hierarchy.

Section 3: Margin and application of standard working hours

- ✧ Assessment coefficient setting method
 - ◆ Speed comparison method
 - ◆ Stabilization method
 - ◆ Objective appraisal method
- ✧ Standard working hours adjustment coefficient
 - ◆ Effort degree adjustment coefficient
 - ◆ Proficiency adjustment coefficient
 - ◆ Work environment adjustment coefficient
- ✧ Learning curve and its application
 - ◆ The learning curve
 - ◆ How to improve the efficiency based on the learning curve
- ✧ PDCA improving cycle of standard working hours
 - ◆ The largest source of working hours improvement - operation improvement
 - ◆ How to improve operation

Discuss 7: How to use the comparison coefficient and adjustment coefficient to set working hours in your enterprise?

Discuss 8: How to use the learning curve and methods to improve the labor productivity in your enterprise?

- ✧ Application of standard working hours (enterprise case)
 - ◆ Product cost management (product management department)
 - Product manufacturing cost calculation
 - The calculation of outsourcing processing and pricing
 - ◆ Factory production management (production department)
 - Production plan
 - Capacity management (device management)
 - Work quota and performance management
 - ◆ Process management (technology department)
 - Production line balancing
 - Improve operation method
 - ◆ Human resource management (production and human resources department)
 - Multi skills training
 - Human resources plan

Discuss 9: Referring to the above application, establish of the standard working hours of your enterprise.

Case 5: According to the standard working hours and MRP to predict human resources demand and how to arrange multi skills training.

标准工时与效率改善最佳实践

上海，中国

2015年1月29日至30日



咨询师:

Eric Zhang, 高级工程师, 东南大学硕士研究生学历。

21年的工作经验, 期间担任工程部、质量部、生产物流部经理等职务, 有近10年的管理工作经验。曾赴瑞典总公司及公司在美国, 德国, 瑞典, 马来西亚, 印度等分公司进行工业工程(IE), 物流包装设计, 精益生产及6Sigma等方面的技术交流及培训。

培训特点: 工作二十一年来、外资企业(一家国企, 一家外资, 均为特大型企业)工程技术, 质量, 物料管理等部门工作经历, 有丰富的精益生产、工业工程(IE)技术、运输包装设计、质量管理、物料及仓储管理等方面的工作经验; 精通工业工程, 精益生产, 精益价值流分析, 物流包装设计, 工厂精益布局与物流路径设计, 仓储管理, 6 Sigma等。

授课推崇务实、讲求实效; 培训过程主要以课程体系为主线, 全程案例研习、角色演练、小组讨论、工作实务模拟并同时伴以咨询式培训等形式, 引导学员参与, 并注重其丰富的企业实践改进案例的分享。

服务案例: 雅培、华阳-科斯塔、西门子、上海庄臣、哈尔滨啤酒、东芝变压器公司、东风汽车、康明斯发动机、西蒙电器、升德升电子、美的集团、吉斯特药业、卡夫食品、北京博维航空设施、福田汽车、永康制药、盘山发电、宜宾纸业、渤海能克、浙江移动、京博农化、诺康医药等、韩泰轮胎、联合汽车电子、拉法基、阿法拉伐、三得利……等。

研讨会参加对象:

工艺工程师, 精益制造工程师, IE工程师, 生产主管, 生产经理, 工程经理, 人力资源管理人员等。

研讨会目标:

通过此次研讨会, 掌握:

- 标准化作业对标准工时的意义, 如何制定标准化作业。
- 标准工时的构成、测量方法、影响因素、制定步骤, 宽放率及标准工时的改善。
- 劳动定额的制定, 生产绩效的影响因素及改善。

帮助企业建立科学的标准工时制定方法, 合理制定劳动定额, 为企业合理考评员工绩效提供数据基础, 并提供系统改善作业效率的方法。研讨会中穿插大量讨论、练习及案例。

研讨会形式:

结合生产实践的知识讲解, 通俗易懂, 易于掌握知识要点。案例演示讲解, 实战演练。帮助学员将所学知识应用于企业的生产实践及项目改进。使科学知识真正转化为生产力。小组讨论、互动交流、游戏感悟、头脑风暴、强调学员参与。

内训方案

如果公司有许多人有类似的培训需要, 那么你不妨考虑内部培训的解决方案。培训将在贵公司现场举行。并且培训可以根据您具体的要求来进行。

请联系 **Whitney Shen** 来讨论合作的可能:

电话: **+86 28 8532 7678**

电邮: **whitney.shen@martinlinking.net**

标准工时与效率改善最佳实践

第一单元：标准工时的构成

◇ 时间研究

游戏一：扑克牌游戏引出对标准工时的思考

◇ 标准工时的定义

◆ 标准工时制定的基本条件

- 合格工人
- 作业标准
- 正常的环境和条件
- 普通熟练程度和正常速度

注：测量标准工时一定要注意上述四个要素。

讨论一：对照定义，游戏中的标准工时该如何计算？

讨论二：本企业标准工时的制定是否符合要求？如何改进？

◇ 时间研究的层次

- ◆ 动作（适合动作密集型）
- ◆ 作业要素-若干动作集合而成
- ◆ 操作-若干作业要素的集合
- ◆ 程序-完成某项工作需要执行的作业串
- ◆ 活动-完成某项工作需要经历的过程，由若干程序或工作站组成
- ◆ 功能-构成产品的组件或零件，保证达到某个特定目的所必须的所有活动。
- ◆ 产品-完成最终的产品

在测定标准工时，要根据作业的复杂程度选择合适的测量等级，不可生搬硬套。

讨论三：本企业工时测量到何种等级合适？

◇ 标准工时的构成

◆ 精密时间

- 主作业时间
 - 目标作业（主体作业）
 - 辅助作业

如检查、测量、机器作业时间等

➢ 准备作业时间

- 如换型时间
- 开班前期的准备工作
- 换型后后道工序的起始等待

◆ 富余时间

- 人为富余
 - 私事富余（喝水，擦汗等）
 - 疲劳富余

➢ 其它富余

- 作业富余（质量问题处理）
- 工厂富余（5S、晨会）

◇ 时间分类

◆ 出勤时间

◆ 规定休息/用餐时间

◆ 有效工作时间

◆ 损失时间及消除

- 熟练程度
- 质量损失（原料、不合格品）
- 设备故障时间
- 等待（材料、机器等）
- 作业方法

◇ 标准工时分类

◆ 人的工时-Labor Hour

◆ 机器工时-Machine Hour

注：产能由机器工时决定，即将机器设置为瓶颈。

- ◆ 简单介绍人机协作-提高协作效率

案例一：人机协作改善案例

案例二：流水线铺线案例

参考资料：宽放种类及宽放率参考标准

讨论四：本企业中包含哪些富余时间类别，是分摊到产品标准工时中还是从工作时间中剔除？

讨论五：本企业中包含哪些准备作业时间？是否可以消除或减少部分？如何做？

◇ 标准工时的制定步骤与注意事项

- 标准工时制定的八步骤
- 测量标准工时的要点

◇ 直接员工与间接员工的工时

- 直接员工与间接员工的划分
 - 材料员/生产协调员/领班
 - 组长/技术支持
- 间接员工如何分摊标准工时
 - 分摊标准工时（不建议）
 - 摊入生产成本（建议）

讨论六：企业中有哪一些直接与间接人员，如何对间接人员进行定岗定员，如何考虑其标准工时？

第二单元：标准工时的测定

◇ 直接观测法

◆ 秒表测时法

◆ 摄像法-要剔除其中的浪费时间

标准工时与效率改善最佳实践

- ◆ 工作抽样法
- ◆ 工作日写实

案例三：某家用电器工厂工作抽样法

案例四：某工厂工作日写实

◇ 合成法

- ◆ 预定时间标准法-PTS
 - 工作因素法
 - 方法时间测量
 - 模特排时法-MODAPTS(重点)

◇ 动作分析与 MOD 模特排时法

- ◆ 动作分析的意义
- ◆ 细微动作分析
 - 动作分析沙布利克符号
 - 沙布利克动作分析案例
- ◆ 动作经济性原则
 - 动作经济原则
 - 动作经济原则的制约因素
 - 动作改善的基本原则
- ◆ 模特排时法简介
 - 模特排时法的特点
 - 模特排时法与其它 PTS 对比
 - 模特排时法与动作经济性分析
- ◆ 模特排时法的主要动作类别分析
 - 移动动作详解-M0-M5
 - 结束动作详解-G、P 类动作
 - 身体其它动作详解-重量、脚步动作、视觉、判断等。
- ◆ 模特排时法的应用
 - 动作密集型制造过程时间分析
 - 生产工位布局与设计

练习一：用模特排时法计算给定作业的标准工时

◇ 标准资料法

- ◆ 基于子部件的标准资料法
- ◆ 基于子工序的标准资料法
- ◆ 基于操作的标准资料法
- ◆ 标准资料法在客户需求多样化趋势下的应用-计算标准工时

◇ 测量标准工时的软件-AVIX (先进)

- ◇ 几种标准工时测量方法的比较
- ◇ 作业要素统计及人型流程程序分析

练习二：作业要素表在工时测定中的应用。

练习三：人型流程程序表在工时测定中的应用。

练习四：选择生产线或作业工序，用上述方法进行作业测量和标准工时制定的练习。注意作业划分及测量的层级。

第三单元：标准工时的宽放与应用

◇ 评比系数的设定方法

- ◆ 速度评比法
- ◆ 平准化法
- ◆ 客观评比法

◇ 标准工时调整系数

- ◆ 努力度调整系数
- ◆ 熟练度调整系数
- ◆ 工作环境调整系数

◇ 学习曲线及其应用

- ◆ 学习曲线
- ◆ 如何基于学习曲线提高效率

◇ 标准工时的 PDCA 改善循环

- ◆ 工时改善的最大来源-作业改善
- ◆ 如何进行作业改善

讨论七：本企业如何采用评比系数和调整系数进行工时制定？

讨论八：本企业如何利用学习曲线及方法改善进行劳动效率提升？

◇ 标准工时的应用 (企业实例)

- ◆ 产品成本管理 (产品管理部)
 - 产品制造成本计算
 - 委外加工定价的计算
- ◆ 工厂生产管理 (生产部)
 - 生产计划
 - 产能管理 (设备管理)
 - 劳动定额与绩效管理
- ◆ 工艺流程管理 (工艺技术部)
 - 生产线平衡
 - 作业方法改进
- ◆ 人力资源管理 (生产与人力资源部)
 - 多技能培训
 - 人力资源计划

讨论九：参考上述应用，建立本企业的标准工时应用。

案例五：根据标准工时及 MRP 来预测人力资源需求及如何安排多技能培训。

Standard Working Hours and Efficiency Improvement Best Practices

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