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SYSTEM PPORF IN GARMENT INDUSTRY

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Abstract

At today's competitive market place, there is a need for business organizations to ensure continual improvement. Manufacturing garment companies experience growing pressure to improve quality, increase productivity, and reduce cost with limited resources. Fashion industry need to reduce response time, eliminate errors, and improve customer satisfaction.

Keywords: TQM, 20 keys, garment industry, change, quality

1. INTRODUCTION

Industrial way of garment production needs a thorough preparation of production because in the same time, it is necessary to combine a few factors: people, time, machines and place of production, organization and material in a coordinated and rational system. Technological system of garment production must enable expected quality of product, necessary scope of production, delivery of ready-made garments in the expected time, maximum use of capacity with minimum expenses. Because of a variety of designs of clothing articles and a great number of procedures in the production process, deviations and faults in different places and various frequencies occur. To achieve the production without deviations and faults, it is necessary to introduce methods for evaluating all the factors affecting the quality of products.

A technological preparation consists of an analysis, perfection and improvement of jobs connected with technological processes that can be divided into a few groups of jobs such as: technological analysis of production operations and the choice of means of production, planning technological operations as well as montage, choice of systems of technological process, choice of inter phase transport systems, choice of systems of building in posts, determination of technological- technical characteristics

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necessary to programmed machines, studies of work as well as forming posts. A technological garment production process consists of technological cutting process, sewing process and finishing garments process, in the figure 1.

There are great problems in our fashion industry as far as market research, following competition, investment in its own development, making its own designs, and scientific way of introducing fashion products on the market are concerned. Fast

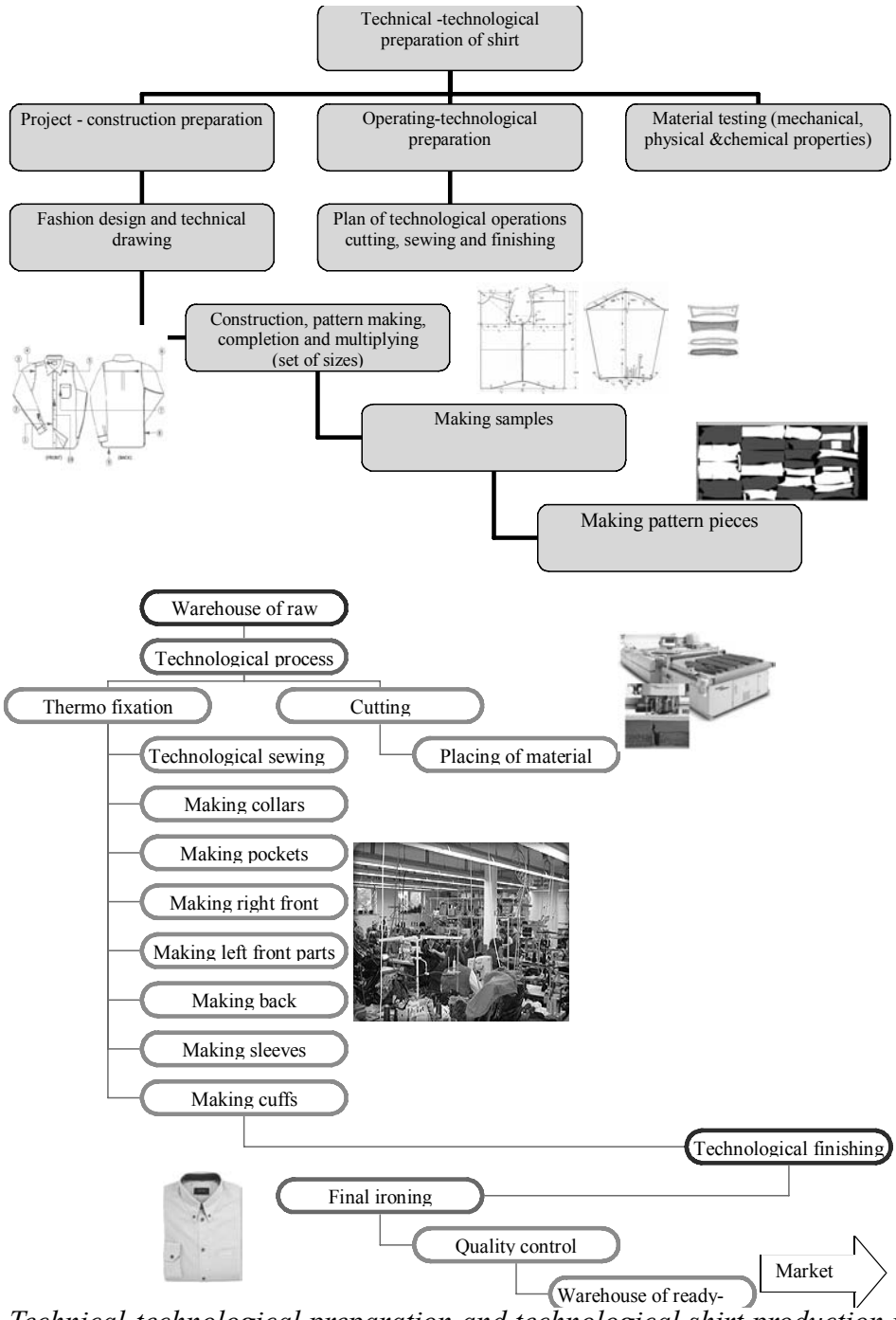

Figure 1 Technical-technological preparation and technological shirt production process

changes in technology as well as customers' expectations make a producer keeping improving his/her fashion products and quality in order to keep his/her position on the market. It is not necessary only to apply the latest technological achievements in the production of high quality garments, although garment production is a very complex process. Quality of each garment production asks for:

1. quality of a product,
2. quality of a textile material,
3. quality of a process of production - quality of a market research, quality of a design, quality of a material purchase, quality of a production as well as of sale.

2. PPORF

One of TQM method PPORF (The Practical Program of Revolution in Factories and Other Organizations) as development Iwao Kobayashi, but first time system used in Toyota Company. System has 20 keys for development production; reduce time and low price, in the figure 2. Today this method is use in approximately 700 companies in 55 countries, like as "Cadbury", "Gillette", "Siemens", "Sanyo", "Mitsubishi Electric", "Seiko Instruments" and "Parmalat". They [1]:

- have better business strategy,
- fast learning and innovation,
- increase productivity and flexibility,
- eliminate errors,
- motivation of workers and
- advance competitiveness.

The method 20 Keys used in Slovenia for 5 years in many companies. For example their garment producer "Elkroj" reduced activity for 24 % and reduced missing workers for 20 %. In "Gorenje" reduced missing workers for 14 % and in "Iskra" reduced stock for 30%.

When companies used this method they get results but "step by step". The best results today is in "Siemens" company (mark 4; companies in Japan had mark 3,5). [2]

The basic difference between the concepts TQM and 20 Keys is the customer approach. TQM is oriented mostly towards the organization's business environment and favours the customer, while the 20 Keys method is oriented mostly towards the internal environment and especially the aspects of its operation. Thus, these two concepts are complementary and can hardly be treated separately in an integrated project in business practice. [3]

3. IMPLEMENTATION PPORF IN GARMENT INDUSTRY

In domestic garment companies PPORF is not in use. In our country we start with reorganization of few garment companies (project Gesellschaft für Technische Zusammenarbeit/ Programm für Wirtschafts und Beschäftigungsförderung in Serbien) for Euro line ("natural" work flow of manufacturing, control tact time, training of the employees, using trolley for transport between sewing machine). But we also need new method for rationalize all system of manufacturing garment. Because of that this analysis is done in the domestic company of produce men's and women's wear to only try how to implementation system.

The system 20 keys include [4]:

Key 1: Because lot of textile materials was on the floor near cutting machine and sewing machine cleaning and organizing workspace is necessary. Workers in cutting room and sewing room must have clean and

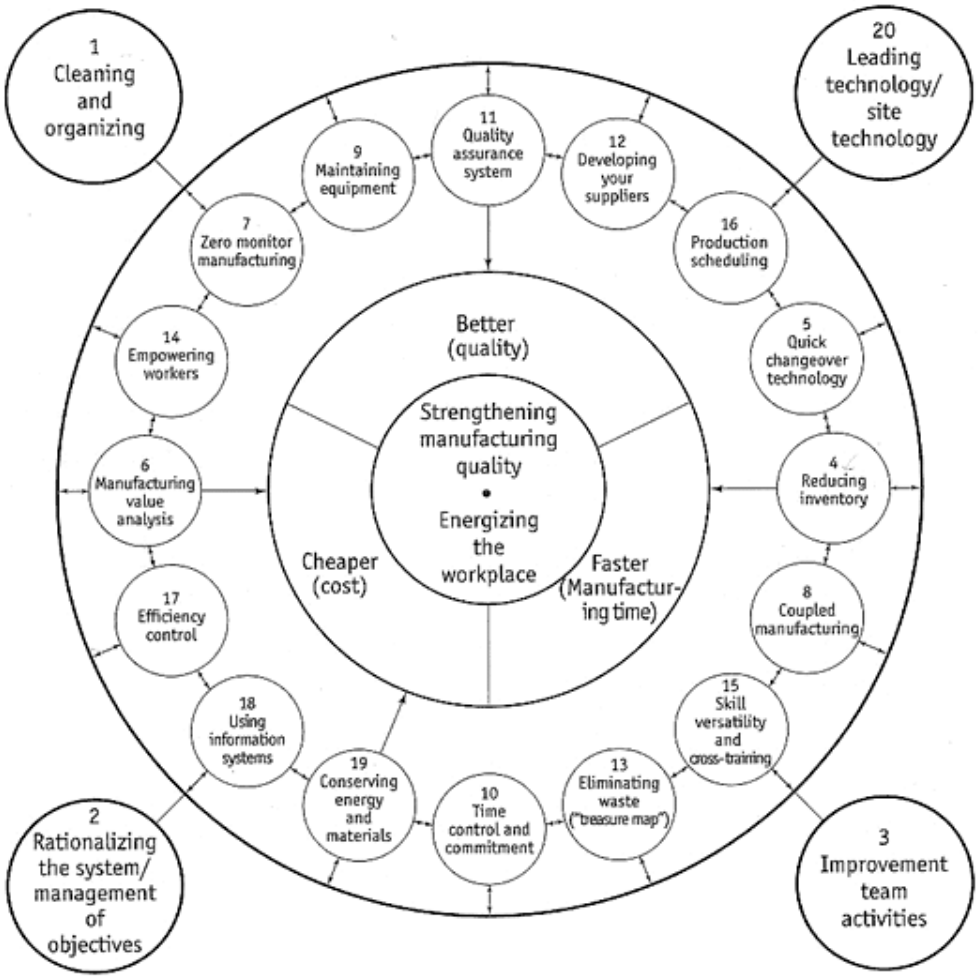

Figure 2. Method 20 Keys [6]

ergonomic workspace with specially tools for sewing (for sewing different seams and border).

Key 2: The rationalize system is "natural" work flow of manufacturing with a lot of the different products (shirts, blouses, skirts and work wear) and description of the new technological specifications for each products. The technological specifications are very big problem in our garment industry.

Key 3: All the employed must be activity ideas and experience. The small group of workers must talk about problems and quality of product.

Key 4: The work in progress in not desirable, because new system reduction of good stocks

Key 5: The new technology for garment production needs flexibility for manufacture in accordance with market requirements. Fast changes in technology as well as customers' expectations make a producer keep improving his fashion products and quality in order to keep his position on the market. Markets researches, consumers' wishes, requests, and criteria mean inevitable and dominant task for a producer of

garments, because by obtaining all these information a production can be directed, business planned with advanced defined aims and strategies. Marketing enables greater flexibility and better organization for more successful reaction to market demands.

Market analyses are perhaps difficult procedures for fashion industry, because they need time to see strong sides and opportunities although they are too eager to identify weaknesses and threats. It is important to be aware that once when weaknesses are identified, some steps to change them can be taken by training, so there is possibility to make it a strong side. That's why BSC, SWOT (on the table 1) and Ansoff's matrix are useful techniques used to find out strong and weak points in a fashion industry, on the figure 3.

Table 1 Alternative strategy of SWOT - Analysis of Opportunities and Threats (mark 1to 5)

Strength (S)		Weakness (W)	
Advantage of geographical location	2	Liquidity	5
Size of garment manufactures	2	High production expenses	3
Development of infrastructure	3	Calculation methods	3
Range of production programme	3	Problems with sale	2
Industrial tradition in region	2	Low level of technology	3
Production capacity	2	Profit trend	2
High quality of garments	3	Structure of capital	3
Stability of suppliers	2	Decision - making speed	5
Energetic collecting of all resources	4	Lack of market information	4
Harmonization of production programme	2	Difficult enter to new markets	3
Total value	26	Total value	33

Key 6: Implementation kaizen is working for the better productivity. In garment industry is lot of orders for many different kinds of clothing, the different colour and textile materials. Every technological operation must to analyze (study of work). In the table 2 is analyze of the working on automat for sewing button hole with MTM (Methods Time Measurement)

Key 7: Zero defect in manufacturing with new sewing automat machine

Key 8: Reduction of good stocks

Key 9: The preventive maintaining cutting and sewing machine and tools (Total Production Maintenance)

Key 10: Control time of manufacturing

Key 11: A Poka-Yoke device is one that prevents incorrect parts from being made or easily identifies a flaw or error. Error-proofing is a manufacturing technique of preventing errors by designing the manufacturing process, equipment, and tools so that an operation literally cannot be performed incorrectly (CAD&CAM, CNC sewing machine for on-line monitoring of seam quality).

Key 12: Co-operation and reliability between the customers and suppliers

Key 13: The manufacturing without failures

Key 14: The team work and motivates all employees

Key 15: Training of the employees. Educating the personnel about the new process and training the workers in the usage of new technology and training the management to offer support to the employees.

Key 16: Definition of the new work flow

Product / Market	Today	New
Today	**Market Penetration** 1.More orders by existing customers and consumers 2.Winning customers and consumers over from competitors 3.Converting of nonusers to users 4.Opening of new shops/stores 5.Extension of working hours of shops/stores 6. Price reduction	**Development of fashion product** 1.Modification of garments 2.Different quality levels of garments 3.New design of garments 4.Strong retail brand 5.Spreading of garment range 6.Eco- tags on clothing
New	**Development of fashion market** 1.New segments of marketing 2.New channels of distribution 3.New geographical region	**Diversification** 1.New supply on a new market 2.New shops on a new market

Figure 3. Ansoff's matrix in a our garment industry

and modelling the steps of the process. Implementation of new organizational structures lake as European Modular System, in the figure 4

Key 17: Control tact time on every 2 hour in sewing room

Key 18: One of the most important conditions for successful carrying out the production procedure is a good organized technical preparation of work. Creation of the plan of activities with CPM or PERT methods or with computer (like as Primavera Project Planner in the figure 5), project and construction preparation of clothes with CAD system and cutting textile materials with CAM system, on the figure 1.

Key 19: Reduce energy and textile material (CAD\CAM)

Key 20: Transfer to the new technology with benchmarking and research and development new fashion produce

4. CONCLUSION

The increasingly global nature of the fashion industry means that making all the right moves has never been more important for success. Today competitive advantage springs from the ability to quickly identify and exploit new trends. Garment manufacturers in fashion industry are divided into leaders and those who copy (copyist). Leaders design a new product, impose and dictate new fashion helped by powerful centres of design and modern technology together with marketing company. Manufacturers who copy are late with production, but find their place in satisfying a large garment production market. Often they don't strike back with the quality of products but there is also a completion between them. The most successful manufacturers in fashion industry are those with organized and expert teams in design and marketing, because they dictate a

Table 2. MTM analyze for making 6 button hole with two sewing automat

Left hand	Symbol	TMU*	Symbol	Right hand
1. Taking the pies of garment				
taking the front part	R30B	14,2	R20B	taking the front part
			G5/G2	taking the front part
taking the front part	G5	8,8	M15B	up the front part
taking the bordures of front part	R15B			
taking the front part	G1A	2,2		
2. Putting the front part on automat				
up the front part	mM10B	4,3	mM10B	up the front part
put on the machine	M30A	12,7	M30A	put on the machine
closing tapes	M45B	16,8		
up the part of machine	M10A	6,0		
down the front part	RL1	2,0	RL1	down the front part
balance of the front part	R10B	12,6	R10B	balance of the front part
taking the front part	G5	2,0	G1A	taking the front part
3. Position on the sewing machine for the front part				
		6,8	M10B	taking to the stitch place
		5,8	M6C	put on the stitch place
		16,2	P2SE	put on the mark
		2,0	RL1	down the front part
		15,6	R40B	taking the front part
		0,0	G5	taking the front part
down the front part	RL2	0,0		
taking the switch	R20A	7,8		
switch on	G5/AF	3,4		
4. Making 6 button hole				
machine		739,0		
5. Walking to next machine				
rotate body at 90º	TB2	37,2		
rotate body at 45º	TB	18,6		
walking	WM1,5	26,1		

* Time Measurement Unit (TMU) = 10^{-5}h ($3,6 \cdot 10^{-2}$s)

cycle of current fashion and introduce new fashion designs surprising competitors.

The problem that exists in our garment industry is that we analyze and follow trends that have already taken place on the fashion scene so while a collection is being accepted and the preparation for production is getting completed a new fashion demand is here, and the old one hasn't got accustomed yet. Fashion companies that do not invest in the development of products and production technology get into danger and can't "keep place" with fashion trend although they try hard. Also, our garment companies must

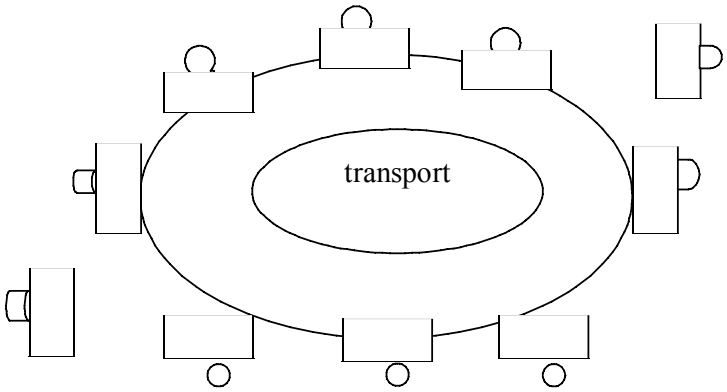

Figure 4. European Modular System for sewing cloth (small group - 10 machine)

exploit the breaking power of technology and its capability to break the rules on which the traditional hierarchical organizational structure is built. The companies must search for new ways of working in a creative and innovative way. They should find answers to questions such as:

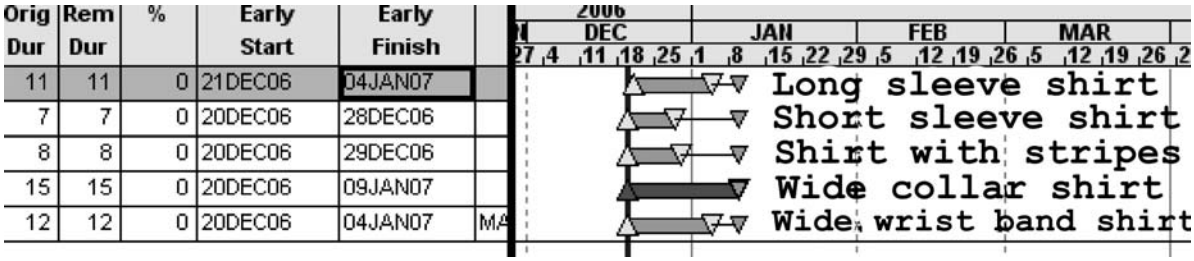

Figure 5. Creation of the plan of activities with Primavera Project Planner

- Where are we today?
- Where do we want to be in a few years?
- How do we go about making the changes happen in manufacturing?
- Who will follow through with the plan of changes?
- How much or how many and which sources do we need? Etc.

The coordination of fashion designers' solution of ideas, possibilities to prepare construction, objective analysis of technical-technological possibilities of firms and management teams gives a chance to get to the strategy that will bring expecting placement and sale of goods on a fashion market for a long time in merciless completion that exist in fashion industry. Working expenses in southeast Europe are still attractive for European conditions, so efforts are made in order to satisfy market demands as well as to accept challenges of Asiatic producers both by quality and prices. Many garment producers use know-how (available technical knowledge) and flexibility as well as closeness of the West-European market. In order to survive in European fashion industry, existing factories should pay attention to the following 5 rules:

1. innovation of products,
2. authenticity of fashion designers' creativity,
3. small series,
4. flexibility,

5. production of special products (sport wear, special and protective clothes) and the use of special markets instead of standard products supply - industrial production to measure, garments for special ages and height.

The analysis of method 20 Key in our company for men's and women's wear in this paper demonstrate us one of way for change organization in our garment manufacturing, because:

- reflects and supports target attainment and quality values for short-term and long-term periods,
- development and engagement of all employees for improvement within the organization,
- resources of an organization (finance, IT, height-tech textile material and new cutting and sewing technologies) are coordinated with the quality of garment and organization values,
- overview of all processes in a garment company and change of the existing combination of processes, emphasis on shortening the technological time,
- indirect connection with customer satisfaction,
- organization will be successful only if it adequately motivates its employees,
- quantitative evaluation as better quality, increase of productivity and reduced stocks.

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