

The Japanese Production System and Flexibility of the Labour Process

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1. Introduction

Why do Japanese workers work themselves to death? It is difficult to readily provide an answer to this serious problem. However, this has recently become an important topic of discussion. From here I would like to examine this problem, within the framework of Japanese workers and their daily work at the workshop.

Recently, Japanese management has aroused people's interest in Japan and abroad, because it is considered to be the secret of the good performance of Japanese economy resulting in high productivity and strong international competitive power of Japanese companies.

Certainly, Japanese capitalism, which rapidly revived from the industrial collapse incurred by World War II, successfully bridged over the worldwide structure changes of capitalism by overcoming the crisis, twice-hit oil crises, and the consequent serious economic recession of these days.

Japanese major companies still maintain their high earning power and keep competitive power which is threatening the United States and European Community industries. This argument is, however, rather superficial in a sense that it doesn't come at another aspect of Japanese economy, for instance, longer working hours, lower wages etc., bad labour and working conditions. Nevertheless, there seems no strong action to stand against this trend among the Japanese worker, especially of major companies. The number of the members of labour unions has been decreasing since 1975, so has been the number of labour disputes both in private and in public sectors.

Absentism, which was often seen in the industrially advanced countries in the 70's, did not influence Japanese workers at all. Amazingly, Japanese companies are still proud of more than 95 per cent of attendance of their employees.

Why is the Japanese workers so industrious in such miserable labour conditions? Forced long and hard labour with cheap wages, without taking enough vacations, why do they go to work day after day? Why won't they go on strike but cooperate with companies, standing out for higher productivity? Here it seems very significant to review at the Japanese management. It will discuss industrial relations as well as overall enterprise states, which Japanese economy has been supported and expanded.

2. What is the Feature of the Japanese Production System?

Is 'respect-for-humanity' really the true essence of the Japanese production system, or is it in fact an 'inhumane' system? In order to fully understand the Japanese production system, this issue needs to be studied thoroughly.

Japanese executives and many researchers maintain that the Japanese production system is a system based on 'respect-for-humanity'. They also maintain that Japanese management (the Japanese production system), which has been the driving force behind the present economic prosperity of Japan, being a system based on 'respect-for-humanity' has resulted in the increase of willingness to work and of participation of Japanese workers in management. This in turn has realized Japan's strong international competitive power through high quality and high productivity. At the same time this system has established the co-operation structure of labour through co-existence and co-prosperity.

Recently, as this kind of 'respect for humanity' holds true universally, Japanese management has been widely adapted into countries of the EC and NIEs. It is believed to be a system of great international value.

Likewise, Haruo Shimada has recently presented an interesting issue in his "The Economics of 'Humanware'" (1988). According to Shimada a special feature of the Japanese production system can be found in the relationship between hard-ware and software in production technology and human labour (humanware) (5)

In other words, 'humanware' is the high flexibility and mutual influence between production technology and manpower. This superior feature of the Japanese production system is therefore seen to be an important contributor to high productivity.

On the other hand, however, in the U. S. production technology and human labour are seen to be in direct conflict with each other; that is to say that technological innovation is believed to result in the laying off of workers. Job specialization, where wages are determined for each particular job and where there is limited mobility between jobs, is a fundamental part of the U. S. production system. The U. S. system should decline the willingness to work and should set a limitation on increasing productivity, due to its job specialization method, the practice of standardization, and the use of workers as individual parts.

On the other hand, in the Japanese production system, where the division of labour is vague, blue collar workers, white collar workers and engineers work together as one body which results in high quality and high productivity.

The secret to a high willingness to work and the consequent high quality and high productivity is attributed to the 'close relation between technology and human labour'. Shimada claims that the special feature of the Japanese production system is that it values the 'role of the worker'. I believe that Shimada is correct, when the 'role of the worker' isn't entirely humane there is a heavy burden on the workers in that workers are forced to be overworked and made to work long hours. The true nature of the Japanese production system cannot be understood if these problems are overlooked.

From here, I would like to examine the concept of 'Karoshi' (death by over-work) which has been revealed to be another characteristic of the Japanese production system.

3. The Japanese Production System and Workplace Regulations

We would like to turn now to specific cases of 'Karoshi'. The following is the case of a design engineer who worked for Hino Motors, a large Toyota subsidiary specializing

Table 1 Annual Working Hours
表1 就労時間経過表

- A. Regular Working Hours.
所定内労働時間数
- B. Overtime (omitting time spent workin on holidays).
所定外労働時間数 (休日出勤における労働時間を除く)
- C. Hours Spent Working on Holidays.
休日出勤における労働時間数
- D. Year Work Hours.
年間労働時間数
- E. Hours Spent Working After 10 p. m. (out of D).
Dに占める22時以降の労働時間数

Year 年度	No of Working Days 出勤日数	A	B	C	D	E	Annual Holidays Taken 年休取得数
1980	247	1,976	499	39	2,514	1	2
1981	226	1,800	469.5	8	2,277.5	11	23
1982	242	1,936	459.5	22	2,417.5	17	6
1983	241	1,928	568	104.5	2,600.5	28	8
1984	236	1,888	548	42.5	2,478.5	66	6
1985	234	1,952	850	167.5	2,969.5	99.5	6
1986	244	1,952	638	94	2,684.0	70	6
1987	86	888	213	27.5	1,128.5	26	5
Total 総計	1,756	14,320	4,245	505	19,070.5	259	62

- 1987 Figures only up to Aug. 5th inclusive.
87年度は87年6月5日までの数字
- Work hours do not include lunches and breaks.
労働時間数は休憩時間を除いた実労働時間
- Number of hours for May 1981 uncertain therefore not included.
81年5月は正確な数値が判明しないため計算外である

Source : National Defense Counsel for Victims of Karoshi (1990) "Karoshi".

in trucks. His widow is now seeking workman's compensation.

Masami is a 36 years old homemaker. She married Shinji at 25 and at the time of her husband's death, had two sons aged 10 and 6 and was expecting another child in a month's time.

Shinji at 37 was an engineer in research and development at Hino Motors. In 1980, when Masami started to sense that her husband's working hours were too long in 1980, she started keeping her husband's pay slips. From the number of work hours printed on the back she could calculate the total number of hours he worked. (Table 1)

The pay slips revealed that from 1980 onwards her husband had worked over 2,400 hours annually and that between 1980 and 1986 his annual average working hours came to approximately 2,600 hours. What stuck her was that in 1985 his annual working hours totalled 2,969.5 hours, 167.5 of this was overtime, of which 99.5 hours were after 10:00 p. m., In 1986 he worked 2,684 hours including 638 hours overtime of which 70 hours were after 10:00 p. m..

We can only conclude that he was simply persevering to the limits of his physical and mental endurance.

This is particularly evident in the records for October 1985 when he worked 126 hours in overtime alone and in the same month from the 23rd day of work he averaged 5.5 hours of overtime per day. The victim worked everyday from 8 a. m. to about 11 : 30 p. m. including breaks and continued for a month. Moreover, he had worked 83.5 hours of overtime the previous month and 129.5 hours the month before that. This could only add to the considerable physical and mental strain that he was already under. This is an example of a period immediately preceding production on a new product where the work was urgent and intense. (3)

Why do the Japanese work themselves to death? There are many social, economical and cultural causes that can be attributed to 'Karoshi'. Here, I would like to concentrate on the social problems of the workplace in Japanese companies.

There are three features of the Japanese production system : long hours, overworking, and stress.

Firstly, why don't Japanese workers take holidays and why do they work such long hours? Here we must refer to the situation of Japanese companies overseas where the Japanese production system is employed and where holidays are not readily being taken, like in Japanese workplaces.

The Mazda plant at Flat Rock (U. S.), where Japanese management has been implemented, has been studied in detail by Joseph and Suzy Fucini.

They point out that workers are unable to take holidays as follows : (1)

"By having workers fill in for absent teammates, Mazda created a self-regulating-attendance system at Flat Rock, which relies on peer pressure to discourage tardiness and absenteeism. At a traditional Big Three plant, with its pool of reserve workers to cover for absences, the worker who shows up late or skips work altogether to go hunting does not incur the wrath of his fellow workers—for, although he has broken the rules, he alone must pay for his transgression."(p. 136)

In the U. S. plant, like in Japan, the concept of JIT, where team-work is used with the minimum required number of workers employed, has been implemented and as a result workers are forced to work without taking holidays.

4. The Japanese Production System and 'Management-by-Stress'

The second feature is that the Japanese production system forces workers to be overworked. As for the JIT system, the most important task is to increase productivity with the fewest amount of workers as possible.

Attaining flexibility in the number of workers at a workshop in order to adapt to changes in demand is called 'Shojinka' in the Toyota production system. 'Shojinka' is explained in Yasuhiro Monden's "Toyota production system : Practical Approach to Production Management"(1983) as follows : (2)

"Obviously, then, Shojinka is equivalent to increasing productivity by the adjustment and rescheduling of human resources. What was called a flexible workshop... is essentially a workshop which is achieving Shojinka. In order to realize the Shojinka concept,

three factors are prerequisite :

1. Proper design of machinery layout.
2. A versatile and well-trained worker ; i. e. a multi-function worker.
3. Continuous evaluation and periodic revisions of the standard operations routine...

The purpose of such improvements is to reduce the necessary number of workers even in the period of increased demand.”(p.100)

In this way, JIT workplaces which employ ‘Shojinka’ use the least amount of workers to produce maximum productivity.

Let’s look at the case of the aforementioned study of the Mazda Plant at Flat Rock by Joseph and Suzy Fucini : (1)

“Sam Hill, a worker in Flat Rock’s tire subassembly station who had come to Mazda from Chrysler’s Jefferson Avenue assembly plant in Detroit, compared the work pace at the two factories : ‘What you did at Chrysler, you do here, plus they give you four more things to take care of... We never had to run at Chrysler, but we have to run at Mazda, because there’s so much pressure to keep up.’”(pp. 149–150)

Additionally it is important to look at the labour structure which puts pressure and strain on Japanese workers in the Japanese production system (JIT).

As a result of a comparative study by Mike Parker and Jane Slaughter, with America’s Big Three’s labour structure the JIT system is referred to as ‘ Management-by-Stress’. (4)

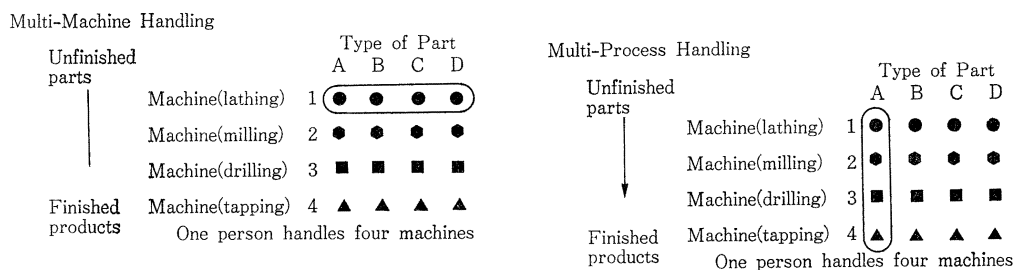
“We prefer the term ‘management-by-stress’ because,... it describes how the system actually works. Management-by-stress uses stress of all kinds—physical, social, and psychological—to regulate and boost production. It combines a systematic speed up, ‘just-in-time’ parts delivery, and strict control over how jobs are to be done, to create a production system which has no leeway for errors—and very little breathing room.”(p. 14)

5. Flexibility of the Labour Process

Multi-functionalism in the form of ‘Multi-Process Handling’ in the Toyota Production is explained as follow .

“A much better way to process work is ‘multi-process handling.’ In multi-process handling, an employee operates different kinds of machines to move items through a processing sequence, one piece at a time (Fig. 1). To draw on our previous example,

Fig. 1 Multi-Process Handling



Source : Toyota Motor Corporation, “The Toyota Production System” : 1992.

Fig. 2 Allocation of operations among Workers in January

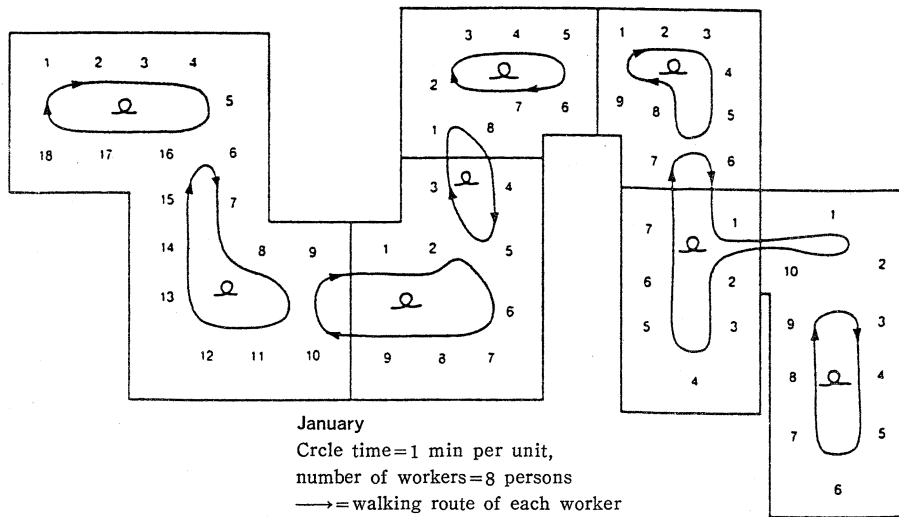
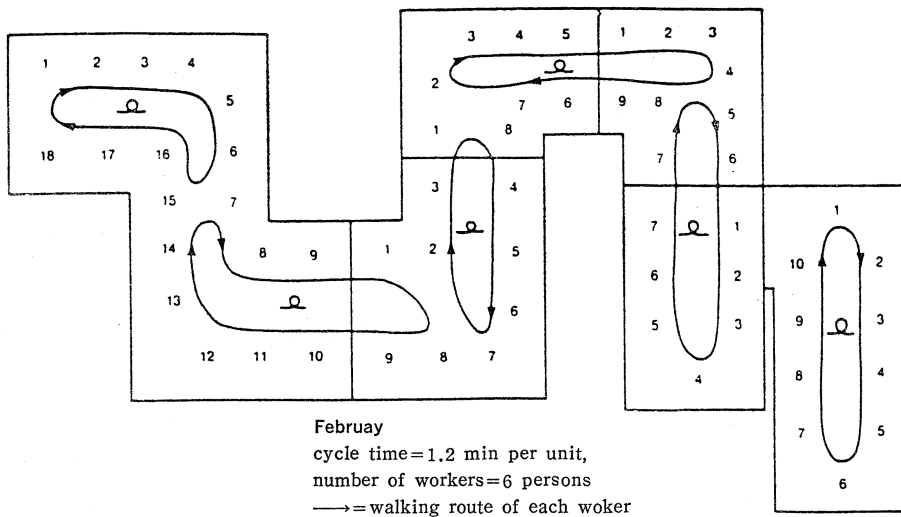


Fig. 3 Allocation of operations among Workers in February



Source : Fig. 2, 3 Monden, Y., "Toyota Production System" : 1983.

the employee might use a lathe, a milling machine, a drill, and then a tapping machine on each item in sequence. In the Toyota production system, the efficiencies we foster through just-in-time production depend on using multi-process handling. We must accommodate that pattern in positioning our equipment, in deploying our jigs and fixtures, and in determining our equipment specifications. Multi-process handling permits great flexibility in the form of what we call 'flexible manpower lines.' On a flexible manpower line, we can adjust the personnel assignments to meet changing production requirements without compromising productivity".(pp. 35~36)(6)

The cultivation of this type of multi-functionalism is nothing more than the flexibility

of efficiently completing various tasks with a few number of workers.

'Shojinka' is seen to be a special feature of the Japanese production system. In order to make 'Shojinka' a reality, flexibility of labour, namely 'multi-function worker' is necessary. 'Ouen' is a concrete example of a method of 'Shojinka' in the Toyota production system.

In order to attain flexibility in the number of workers in a workshop, to adapt to demand changes, workers are transferred from workshop where demand is low to workshop where demand is high.

In Fig. 2 there is an eight-man workshop, but two workers have been sent to another workshop as 'Ouen'. The, now, six-man workshop is shown in Fig-3. Here the six workers have to take over the work of the two workers who have been sent to another workshop. However, it's not always possible to take over the work usually done by the other two workers. This is the reason behind the search for 'multi-function workers'.

In the Toyota production system (JIT) 'multi-function workers' differ to the original meaning of 'skilled workers'. Here, 'multi-function workers' means the adaptive capacity to achieve many tasks in a short time such as one minute.

Moreover, 'multi-function workers' are strictly, instructed by the 'standard operations routine' in regards to work procedures, time to be taken and work quotas in their given tasks. This is in content a form of 'Super Taylorism'. Therefor, it can be seen that the meaning of QWL in the Japanese production system is limited.

6. Mandatory and Voluntary in the Japanese Production System

As has been previously mentioned, the Japanese production system is a mandatory form of personal management with the pressure of team work and stress being caused by the JIT system.

However, one also cannot deny here the underlying withdrawal mechanism of the voluntary aspect of workers. Workers on the other hand are mollified by the existence of 'equal treatment of workers', 'encouragement of involvement in management' and the 'flexibility labour structure'.

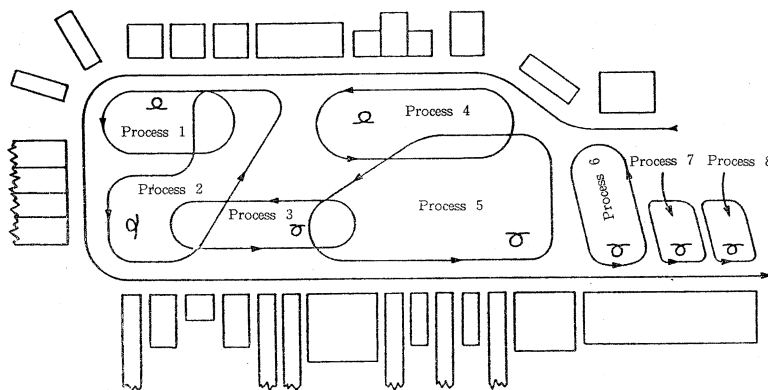
Therefor, how in fact are tasks at the workshop organized in Japanese factories? I would like to elaborate on this while referring to the research completed by Y. Monden.

Toyota first implemented a job rotation plan at their Tsutumi Factory (Machining plant No. 2) where they process and assemble rear-wheel differential carriers.

At each work's shop and line there are general foremen, foremen, and line chiefs, respectively. General workers are the responsibility of each line chief with a total of 220 employees working at the plant. Rotation of workers among jobs was implemented following in line 2 of shop no. 523. In this line, the 160 ϕ differential carriers are assembled by eight workers (excluding the line chief as a relief man) within its cycle time of 26 seconds. The layout and the standard operations routine of each worker are depicted in Fig. 4. Keep in mind that each process means the standard operations routine, or in other words, the walking route of each worker. Such a walking route will not change unless the cycle time of this line will be changed.

The manual operations time to complete one unit at each process was about 26 seconds

Fig. 4 Layout and standard operation routines



Source: Monden, Y., "Toyota Production System": 1983.

Table. 2 Job characteristics and fatigue rank of each process

Process No.	Contents of the job at each process	Dharacteristic of operations	Manual operations time	Fatigue rank
1	Differential case	Skill of finger work is required	26"	4
2	Cover assy	Skill and knowledge of quality check are required	26"	5
3	Can adjust	Long walking distance	26"	3
4	Ring gear assy	Finger work, and heavy work by right arm	26"	1
5	Pre-load adjustment	Long walking distance with heavy material	26"	2
6	Bearing assy	Sensitivity of hand and finger is required	26"	6
7	Beck-rush holding	Skilled work, and heavy work by waist and arms	26"	7
8	Rock-dolt assy	Waiting time of 2 sec. exists	24"	8

Source: Monden, Y., "Toyota Production System": 1983.

for all workers except at process 8. The job characteristic and fatigue rank of each process in this line are described in Table. 2. The grade of fatigue at each process will be different depending on differences of the contents of the operations.

Job rotation at shop 523 is accomplished in intervals of two hours. First, a predetermined job rotation schedule must be planned for the five days of the following week. When planning this type of schedule, it should be noted that the allocation of the vari-

Table. 3 Job rotation schedule for workers A-H

Times of rotation	Line name Process no. Time interval	160 ϕ differential assembly line							
		1	2	3	4	5	6	7	8
1	8 AM—10AM	A	B	C	D	E	F	G	H
2	10AM—12AM	G	A	B	C	D	H	E	F
3	1 PM—3 PM	E	G	C	A	B	F	A	H
4	3 PM—5 PM	D	C	G	B	A	H	F	E
5	5 PM—7 PM	B	D	C	F	E	A	G	H

Source : Monden, "Y., Toyota Production System" : 1983.

ous processes among workers must be fair ; also, the training program for the newcomer must also be considered (pp. 108~111). (2)

Each morning, the general foreman listens again to the health conditions and desire of all workers, and also reexamines the proper way to introduce extra workers onto the line. Finally, he determines the job rotation schedule (Table. 3).

In this job rotation schedule, the following conditions of the workers H. B and C should be considered :

- 1 Worker H is a veteran, but yet sickly.
- 2 Worker C is a long-term extra worker from outside of the company.
- 3 Worker B is still in a training stage for process 1. Therefore, when worker B works at process 1 in his fifth rotation time, veteran worker D will support him as a nearby worker.

At this shop, all workers except C and H will engage in different kinds of job in each two-hour interval. Since this workshop has a smaller cycle time (26 seconds), the worker must have a narrower range of jobs ; this is the principal reason for assigning a two-hour interval to this shop. In the event the cycle time was longer, however, workers could handle a wider range of jobs. and thus a four-hour interval could be applied. Some shops even have eight-hour intervals (or, one-day interval)(p. 111). (2)

A Japanese factory has a basic work structure of groups of roughly ten people. For example, if we look at the work arrangement employed in the workshop of Toyota Motor Company, we can also seen basic work units of six to eight people. Members of these work teams work towards 'helping each other', this kind of 'team work' based on helping one another carried out an important role in the willingness of workers to work. I believe that workers have always wanted to be accepted by their colleagues and, therefor, want to co-operate and stengthen team solidarity.

In particular, on assembly-lines where the feeling of alienation and powerlessness among workers is increasing, to lose the trust and respect of one's colleagues would be terrible. Where work is very demanding, I think that workers rely on helping each other and co-operation on even the smallest things.

This kind of co-operation should result in work being efficiently carried out by the

work-team. It is ideal to have groups which become a learning structure, through work team, which have progressed by co-operating and teaching each other.

In order to obtain, however, this kind of co-operation and 'mutual teaching', it is necessary for each worker to move through various types of work, i. e. Job-Rotation, and not to have a fixed job. Furthermore, in order to add to the work experience of an entire team it is necessary to share around all acquired knowledge of each individual worker to the whole team. For this purpose, the calculated job-rotations at the workshop enables the advancement of multi-functionism. In order to strengthen the team-work of the work groups, the apportionment and distribution of tasks are based on a principle of fairness and equality, furthermore, this is decided on by mutual consent of the team members. For example, during morning meetings at the workshop, the foreman and group leader decide on the distribution and combination of work for that particular day, while listening to individual opinions and taking all employees physical condition into account, the 'Job-Rotation Schedule' is drawn up and posted in the workshop.

Moreover, the schedule is devised to enable an efficient reflection of the circumstances of each individual group members at the workplace and of 'Ouen' staff who have come from other workshops. Also, veteran employees are arranged so that they are directly in front of and behind any new employees or employees who are still in training; this is a device for guidance. In this way, the formation of work, through arrangement of worker, allotment of tasks and the order of job-rotations, results in a very flexible and autonomous workplace. Surely this also results in a noticeable increase in the willingness to work hard through the increased feeling of responsibility towards the group and the mutual consent on special circumstances at the workplace.

It is not only the pursuit of efficient work by individual employees, which is important. It is also important to take notice of the new kind of united power in a co-operative industry, called team-work, which has been incorporated by the Japanese production system and which holds the meaning of group technology.

However, this kind of team work and autonomous formation of work is limited, because it is actually merely the flexibility of the framework of the management system of the whole company.

As mentioned earlier, team work is incorporated in order to achieve efficiency of work by the workers at the workshop. Also, the autonomous formation of work at the workshop is merely a derivation of the autonomous decisions made by the company regarding the framework of production and necessary personnel.

If management is introduced into the work teams, competition among workers would become intense. In turn, team members would start to keep an eye on what each other was doing, therefore team work and the autonomy of the workshop would double the pressure on the group and this pressure would affect the workers.

In this way, the autonomy of workers derived from team work and autonomy of the workshop is derived from the mandatory management system. This kind of management system now being incorporated into Japanese workshops.

As has been discussed up until now, members of the work teams of Toyota factories are organized into tasks with careful consideration given to skill levels; whether they

are new employees veterans and also, to their health condition. Also, there is the special feature where, in order to obtain flexibility, the formation of work at a factory is geared towards the respective circumstances of each particular workshop. That is to say, if tasks are not organized in such a way that is suited to the workshop, the very rigid work quotas will become unattainable. The will to work and the feeling of responsibility towards a work team is strengthened when the formation of work is based upon careful consideration of the condition of workers.

7. Conclusion: In the Cause of Genuine Respect for Humanity

In recent years, a wave of Japanization has been spreading widely over Europe, America and even Asia. In general terms, Japanization is the transfer and popularisation of the Japanese production system.

Overseas, where there has been a transference of the Japanese production system, job classification has intensified and the regulation control of unions has been dismantled and the reshuffling of labour has been made easier. The role of decreasing man power in order to greatly increase productivity has been achieved through the introduction of the JIT system.

Another special feature of the Japanese production system is the activities of the teamwork orientated QC, where bottom-workers and up are all consciously included in the organisation of the company. This system where a deversification of labour is encouraged and the consciousness of labour is recovered, will lead to an increase in productivity. In these sense, this system is seen to be a new system of production.

Nevertheless, the Japanese production system (JIT) is presently at a turning point due to labour shortage, and transport and environmental problems. In times like these, it is necessary to investigate the way in which the system can be reformed towards one which has genuine respect for humanity by re-assessing the fundamentals of the present Japanese production system.

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