Social Aspects of Shift Work in Japan

Kazutaka KOGI [1]

Introduction

SHIFT WORK may be expected to increase in an industrialised society, and in Japan the past two decades have seen the spread of shift work to new industries and its expansion in industries where it was already being practised. The use of costly machinery and other costly equipment has been an important reason, and the reorganisation of time-tables called for by the reduction in hours of work has provided obvious opportunities for introducing shift work. Unfortunately, insufficient attention has been paid to its effects, and the conditions governing it are determined only by custom, by the works rules, by collective agreement and by the general legislation on hours of work, which allows, moreover, many exceptions. An attempt is made in this article to illustrate certain problems of shift work in Japan and to consider probable trends for the future. Some current disputes are described and their effects on the system are discussed.

All the changes that have recently taken place in the conditions of work of shift workers derive from a growing concern with the social consequences of increased shift work, stress being placed on the disadvantages to the worker and his family. Shift work, in short, is no longer a mere bargaining item in the interplay of expanding production and higher wages.

One of the most important recent changes has been the adoption of four teams, instead of the previous three, in the three-shift system operated in iron and steel works. It was about 1960 that the trade unions in the pulp and paper, chemical, and iron and steel industries first called for the change to four teams in continuous three-shift systems. This change began to be introduced gradually towards the beginning of

[1] M.D., Laboratory of Work Physiology, Railway Labour Science Research Institute, Kokubunji, Tokyo.

the decade, but the iron and steel industry took nine years to give it full effect.

The four-team three-shift system has the great advantage of providing each team with less night work and more days off and is gradually gaining ground in other industries where continuous operation is needed. The trend towards less night work is also found in semi-continuous shift systems in mining and certain manufacturing industries, where the situation is rather different because rotation is so organised as to provide free Sundays. In the manufacture of machinery, in printing and in computer operation, however, irregular shifts have been marked by much overtime and by new controversies and have not been found entirely satisfactory.

Another important event of the 1960s has been the reduction in the number of night shifts worked by hospital nurses, who succeeded in 1965 and the following years in having this number reduced to eight per month in national hospitals and about eight in many others.

These recent changes provide a useful basis for discussing the future of shift working. It is probable that most workers are not well adapted to shift work, for their interest in its effect on their lives seems to be increasing. A multidisciplinary examination of the whole question, then, will be necessary if existing and future problems are to be solved.

Trends in shift work

The spread of shift working in the chief branches of industry can be seen in table I, which shows that it is practised by many undertakings in mining, transport and communications, public utilities and manufacturing, and that there have been appreciable increases in its use during the 1960s. An analysis of the figures for manufacturing shows a positive correlation between the size of the undertaking and the proportion of the staff on shift work.

Among the main reasons given by undertakings for adopting shift work have been: managerial requirements, technical requirements, and the avoidance of long hours of work. An interesting example of changing attitudes is provided by transport and communications, where the needs of the public, the reason usually given for shift work before 1960, gave way to managerial requirements during the period 1960-64, and since then to the avoidance of long hours of work.

There is less shift work in wholesale and retail trade, finance and insurance, and construction, but an upward trend has appeared in these branches of activity. Moreover, if the number of offices applying shift systems to work with office machines or computers remains small, recent reports point to an increase.

Table II shows the percentages of shift workers in various branches of activity, those engaged in watchkeeping or intermittent work not

TABLE I. PERCENTAGE OF UNDERTAKINGS EMPLOYING SHIFT WORK AND YEAR OF INTRODUCTION

Industry	No. of undertakings (with 30 or more workers)	% of undertakings employing shift work	% of undertakings introducing shift work in indicated period		
			Before 1960	1960-64	Since 1964
Mining	1 543	54.4	34.9	9.7	9.9
Construction	7 996	2.9	1.1	1.4	0.4
Manufacturing	55 164	23.2	13.4	6.0	3.8
500 workers and over	(5 858)	(38.9)	(27.7)	(6.4)	(4.8)
100-499 workers	(15 006)	(26.6)	(14.1)	(8.0)	(4.5)
30-99 workers	(34 300)	(19.0)	(10.6)	(5.1)	(3.3)
Wholesale and retail trade	16 476	8.1	5.1	2.8	0.2
Finance, insurance and real estate	6 114	4.6	2.7	1.6	0.4
Transport and communications	8 759	35.5	19.4	11.2	4.9
Electricity, gas and water supplies	448	68.7	65.0	2.0	1.8

Source: General survey of wages and working hours conducted by the Ministry of Labour (1969).

being taken into account. The over-all figure of all these branches together in 1969 was 14.4 per cent of workers in undertakings employing thirty or more workers. This fraction of the total amounted to about 1,651,000 workers, including 1,156,000 in manufacturing, 277,000 in transport and communications, 124,000 in mining, 63,000 in wholesale and retail trade, and 15,000 in public utilities.

In respect of their patterns of shift work these branches of activity fall into the following five groups: *(a)* the textile industry, where the double day shift system [1] is usual, *(b)* the manufacturing of transport equipment and other machinery and the printing trades, where a two-shift system is usual but night shifts are also common, *(c)* work in such establishments as power plants, paper mills, chemical plants, petroleum refineries, and iron and steel works, where continuous three-shift systems predominate, *(d)* mining and certain manufacturing activities, where semi-continuous three-shift systems interrupted at the weekend are usual, and *(e)* transport and communications, where two-shift and three-shift systems are common but the alternate-day system [2], rare in the other groups, is dominant.

[1] System with two day shifts and no night shift.

[2] System with twenty-four hours (sometimes exceeded) on duty and twenty-four hours (sometimes curtailed) off.

TABLE II. PERCENTAGE OF SHIFT WORKERS AND DISTRIBUTION BY SHIFT SYSTEM

Industry	All shift workers	Two-shift workers	Three-shift workers	Alternate-day workers	Other systems	Workers sometimes on duty at midnight as fraction of all shift workers
Mining	46.0	11.0	34.8	—	0.1	78.0
Construction	1.2	0.4	0.6	0.1	—	—
Manufacturing:						
Food and kindred products	8.7	5.0	3.5	—	0.2	65.7
Textiles and textile products	31.7	30.4	1.2	0.1	0.1	5.1
Furniture, lumber and wood products	4.1	2.3	1.7	0.1	—	90.5
Pulp, paper and finished allied products	28.3	2.0	26.3	—	—	91.8
Publishing, printing and allied industries	13.7	7.1	2.2	1.0	3.4	91.6
Chemical and related industries	24.0	4.2	19.6	0.1	0.1	88.9
Petroleum, coal, rubber and leather products	12.8	3.8	9.1	—	—	90.5
Stone, clay, glass and pottery products	16.5	7.6	8.3	0.5	—	91.3
Iron and steel	39.4	13.0	25.8	0.3	0.3	97.3
Non-ferrous metals	22.8	12.9	9.5	0.3	0.1	92.2
Manufactured metal products	3.3	2.6	0.7	—	—	86.2
General machinery and equipment	4.0	3.2	0.5	0.2	0.1	80.9
Electrical machinery, equipment and supplies	5.0	3.8	0.9	0.1	0.1	70.5
Transport equipment	13.7	12.2	0.8	0.4	0.3	88.3
Scientific and optical instruments and watches	0.5	0.4	0.1	—	—	91.5
Miscellaneous	8.3	5.0	3.2	0.1	—	69.2
Wholesale and retail trade	4.3	4.0	0.1	—	0.2	—
Finance, insurance and real estate	1.3	0.6	0.5	—	0.1	—
Transport and communications	28.5	6.9	3.0	15.0	3.6	—
Electricity, gas and water supplies	15.2	0.3	14.2	0.1	0.6	—

Sources: First five columns: General survey of wages and working hours conducted by the Ministry of Labour (1969). Sixth column: Survey of shift systems conducted by the Institute for Science of Labour in 1961 (see Kazutaka Kogi: "On the present status of shift formation in Japanese industry and mining", in *Journal of Science of Labour* (Tokyo), Vol. 38, No. 3, Mar. 1962, pp. 135-145).

With the data available it is difficult to know what proportion of the two-shift workers of table II work double day shifts and what proportion work night shifts. Some indication can be found in the last column, which shows that the two-shift systems of the second column do not necessarily preclude night shifts, but it must be observed that this column is based on a different survey carried out at a different time. It may be mentioned that the extremely high proportion of two-shift workers in textiles, mostly very young women on double day shifts, renders this industry unique.

Most of the two-shift workers in manufacturing, especially in metalworking and machine shops, and in the printing trades operate either the two twelve-hour shift system or what is called the " discontinuous day-night shift system ". Under both these systems work is interrupted at the weekend, when the change of shift takes place. The latter system provides day and night shifts of about eight hours each separated by intervals of several hours. It is popular in machine shops where operations can be interrupted easily, but the encroachment of overtime on the intervals is so common that it has become in fact a loose modification of an ordinary semi-continuous two-shift system.

Shift work on office machines and computers generally follows a double day or multiple day system, but irregular two-shift or three-shift systems including night work are not uncommon.

The 1969 survey cited in tables I and II showed totals of about 870,000 two-shift workers, 565,000 three-shift workers and 160,000 alternate-day workers in the branches of activity shown in table II. On the basis of the 1961 survey cited in this table it was estimated that 26 per cent of two-shift workers in manufacturing worked night shifts and 16 per cent discontinuous day-night shifts, that 92 per cent of all two-shift workers were normally free on Sunday and that 33 per cent of all three-shift workers were engaged on semi-continuous systems and were also free on Sunday.

The 1969 survey showed further that about one-fifth of the larger undertakings in manufacturing employ more than two teams for continuous two-shift systems. This may be in part a transition from the systems of two twelve-hour shifts that were normal before the Second World War, but it is true that shifts of about twelve hours are considered practical even today for continuously operating automated plant. The four-team two-shift system, for instance, is gaining ground and is now found in 5 per cent of undertakings. This entails an average working week of forty-two hours per team and is therefore convenient where working hours can be reduced to this level and where the work involved is physically light (such as monitoring), making long shifts a practical proposition.

In 1961 only 4 per cent of all three-shift systems (6 per cent of continuous three-shift systems) surveyed in manufacturing industries

were known to be operated by four teams. By 1969 the figure was nearly three times as high, though it must be remembered that the basis of the survey was rather different. The four-team three-shift system is now common in manufacturing, for, as has already been said, it has been adopted by the larger iron and steel works. To be more precise, they adopted it in April 1970, that is about six months after the government survey of 1969. Roughly one-fifth of continuous three-shift systems in the larger manufacturing undertakings are operated by four teams.

Keen controversy still surrounds the use of four teams in three-shift systems. The use of five teams is also discussed and has actually been adopted in some enterprises. The controversy has led to more specific discussions on the rotation of teams and in particular the cycle of rotation. Nearly all the new four-team three-shift systems in Japan have a rotation cycle of eight to twenty days, with a period of two to five consecutive days on the same shift for a given team, which is considerably shorter than that usually found in Europe. In iron and steel works a team changes its shift every four or five days, whereas it used to do so every six or seven days because a rotation cycle of three weeks was customary in both continuous and semi-continuous working. In 1961 the change of shift occurred every five to seven days under more than 70 per cent of continuous and semi-continuous shift systems. Even today, under semi-continuous two-shift and three-shift systems and discontinuous day-night systems, a team usually works the same shift for six days in succession since there is no work on Sunday.

The new tendencies in the rotation of teams are of interest to many physiologists and others concerned with occupational health. Japanese experts, like their European counterparts, claim that workers cannot adjust completely to the inverted work-rest pattern of the night shift and that its effect can best be reduced by keeping sequences of night shifts brief and according ample time for rest between them. The necessary conditions can be achieved under four-team and five-team three-shift systems, which allow more rest and more frequent changes of shift. The results of a number of investigations and experiments have been referred to in this connection by both management and trade unions.

Legal provisions

Hours of work, rest periods and annual holidays are governed in general by the Labour Standards Law of 1947[1] but little is laid down specifically about shift work. Section 89 provides that an employer who employs more than ten workers continuously shall draw up works rules, that these shall be submitted to the authorities, and that among the items

[1] ILO: *Legislative Series*, 1947—Jap. 2.

they cover shall be " matters pertaining to the change of the shift when the workers are employed in two or more shifts ". Section 90 makes it clear that the majority of the workers must be consulted and that their views must be submitted to the authorities with the works rules. Section 62 provides that persons under 18 and women shall not be employed on night work, but allows wide exceptions to the prohibition and states in particular that it shall not apply to boys of over 16 employed on rotating shifts.

The Law prescribes in principle an eight-hour day or, at the worst, forty-eight hours' work per week averaged over a period of four weeks, but there are wide exceptions here too, and these are naturally applied to shift work. Most important of all, under section 36, hours of work may be extended by agreement with the majority of the workers concerned. Section 40 in any case allows long overtime in certain branches of activity in which shift work is common, for example commerce or the health services, where average hours of work over a period of four weeks may be fifty-four, and transport, where they may be sixty, except for drivers. This overtime may itself be extended under section 36. The weakness of the legislation on the subject is probably one of the main reasons why longer hours of work are very often found among shift workers and rotation systems improve so slowly despite the increase in shift working.

However this may be, hours of work and shift rotas depend mainly on collective bargaining. The extent to which the length of a night shift, that is to say a shift including the hours between 10 p.m. and 5 a.m., can vary in manufacturing is shown in table III. Travelling problems (e.g. the scarcity of public transport late at night) may be among the reasons why night shifts tend to be longer than others and therefore generally last more than eight hours. The periods shown in the table run from clocking in to clocking out. It should also be noted that the length of the break within the shift varies, since the Law provides for a break of forty-five minutes in shifts of from six to eight hours and of sixty minutes in those of over eight hours.

Shift work is sometimes introduced to make possible a reduction in hours of work and then the shift worker shares in the general improvement in his branch of activity. As has already been said, however, certain shift workers work long overtime. Examples are provided by two-shift workers in trades such as printing that work to meet specific orders and, of course, by taxi drivers who work extremely long shifts on alternate days.

Other drawbacks to shift working relate to rotas and rest days. The only provision of the Labour Standards Law that might be expected to discourage long hours, namely that contained in section 37 prescribing extra wages of at least 25 per cent for overtime and night work, does not seem to be very effective. There are still old-fashioned shift systems with very long shifts and inadequate rest periods. Shifts of about twenty-

TABLE III. PERCENTAGE DISTRIBUTION OF NIGHT SHIFTS, INCLUDING BREAKS, BY LENGTH OF SHIFT (MANUFACTURING INDUSTRY)

Hours	Two-shift system	Three-shift system	Alternate-day shifts	Shift with follow-on night duty	Discontinuous day-night shift
7	—	1.4	—	0.5	1.2
8	0.4	69.8	—	22.3	46.2
9	0.4	15.6	—	7.6	26.0
10	—	10.2	—	5.1	11.8
11	1.8	1.8	—	3.0	8.9
12	68.5	1.2	—	16.8	5.9
13-14	15.4	—	—	4.6	—
15-16	10.2	—	0.3	9.6	—
17-23	3.3	—	0.9	3.6	—
24+	—	—	98.8	26.9	—
Total	100.0	100.0	100.0	100.0	100.0

Source: Survey conducted by the Institute for Science of Labour in 1961 (see Kogi, op. cit.).

four hours are found not only among the taxi drivers already mentioned but also among factory watchmen and guards, railway signalmen and others whose work, formerly only intermittent, now tends to be more or less continuous. Discontinuous two-shift systems tend to lengthen both the night shift and the day shift, as has already been mentioned. Most continuous three-team three-shift systems inevitably include either a double shift of about sixteen hours or two separate shifts of twelve hours in the cycle when rotated in the order morning-evening-night or a very short rest period of about eight hours at the change of shift when rotated in the order night-evening-morning. These long shifts, even those including night work, often have inadequate breaks. Besides, double shifts and shifts extended by long overtime give the right to only sixty minutes' break.

Three-shift workers are also at a disadvantage in respect of the four rest days prescribed by law for each worker in each period of four weeks. A rest day is normally a full calendar day, and a break in work of twenty-four hours cannot properly be considered a day of rest. According to a Ministry of Labour circular of 1948, however, the rest interval of twenty-four hours of a three-shift worker constitutes a legal weekly day of rest. This administrative interpretation was obviously intended to attach the quality of a day of rest to the shift-changing interval of twenty-four hours prevalent at the time in three-team three-shift systems, but it need hardly be said that a break of twenty-four hours between shifts is not a full day of rest.

As has already been said, the Labour Standards Law prohibits in principle night work (normally work between 10 p.m. and 5 a.m.) by

persons under 18 and women, but excepts boys of over 16 on shift work from the prohibition. It should be added that the eight-hour shift and forty-eight hour week must be strictly applied to the work of such boys. Other exceptions concern work in agriculture, forestry, fisheries, and, for women but not for boys, hotels, restaurants and similar establishments. There are further exceptions for women in nursing, telephones, aviation, broadcasting, acting and many other activities, and certain employers' organisations have recently been urging a general relaxation of the prohibition with a view to giving women more occupational opportunities, but public opinion seems to be against further relaxation. Occupational health circles argue that the present rotas of nurses and telephone operators should be improved and that any further extension of night work by women should be prevented for the sake of motherhood and social and family life.

Slight modifications to the hours considered to be night hours may be permitted by the administrative authorities to facilitate a double day shift by young women in textile mills. There can thus be two eight-hour shifts, each with a break of forty-five minutes, an arrangement that enables the mills to function for seventeen-and-a-half hours a day, normally from 5 a.m. to 10.30 p.m.

It should be mentioned that women's overtime is restricted to two hours a day, six hours a week and 150 hours a year.

Problems raised by new shift systems

The change to the four-team three-shift system in iron and steel illustrates the current trend. Table IV shows old and new rotas in a typical plant. Average weekly hours of work are now 39.07, and the new scheme has been widely welcomed for its various advantages, which include rest periods of two consecutive days after a sequence of night shifts instead of the former twenty-four hours and the abolition of the old double shift at the end of a sequence of morning shifts.

Under the new system, however, problems of some importance are raised by the reduction in hours of work. The workers claim that they have to work harder and that certain changes in the organisation of work are unfavourable to them. The total length of breaks in the larger works, for example, has been reduced from sixty minutes to forty-five minutes per shift, the extra fifteen minutes being worked to offset to some extent the much greater number of rest days. As twenty minutes of the forty-five are absorbed by intermediate breaks the period remaining for a meal is reduced to twenty-five and the workers naturally claim that this is too short. Moreover, the number of sittings for a meal has been increased in order to leave more people at work. For example, where there were six sittings there are now eight to ten and the meal

TABLE IV. EXAMPLE OF A CHANGE OF SHIFT SYSTEM IN AN IRON AND STEEL WORKS IN 1970

Old system

Shift	Day of week																		
	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
Morning (8 a.m. to 4 p.m.)	B	A	A	A	A	A	A	A	A	C	C	C	C	C	C	C	B	B	B	B	B	B
Evening (4 p.m. to midnight)	B	B	B	B	B	B	B	A	A	A	A	A	A	A	A	C	C	C	C	C	C	C
Night (midnight to 8 a.m.)	C	C	C	C	C	C	C	B	B	B	B	B	B	B	B	A	A	A	A	A	A	A
Off day	A							C							B						

New system

Shift	Day of week																		
	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F
Morning (8 a.m. to 4 p.m.)	A	A	A	A	A	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
Evening (4 p.m. to midnight)	C	C	D	D	D	D	D	A	A	A	A	A	B	B	B	B	B	C	C	C
Night (midnight to 8 a.m.)	B	B	B	C	C	C	C	C	D	D	D	D	D	A	A	A	A	A	B	B
Off day	D	D	C	B	B	A	A	D	C	C	B	B	A	D	D	C	C	B	A	A

Note: A, B, C and D indicate teams of shift workers.

extends over three or four hours, so that some of the workers may start their lunch before 10 a.m. and others after 1 p.m.

Another problem, and one that may be peculiar to Japan, concerns the annual holiday with pay. Under the four-team three-shift system workers are entitled in principle to an average of one rest day in every four days, which makes ninety-one in the year. Not all these rest days, however, are in fact taken, because the worker has to be present for a number of " preliminary day shifts ", on which he devotes himself to such activities as repairing, cleaning or training or replaces an absent shift worker. This in itself may not be unacceptable, but many undertakings in iron and steel, pulp and paper, and other industries now try, when the preliminary shift is not worked because it is not necessary to the normal functioning of the establishment or for some other reason, to count the day against the worker's annual holiday with pay. From seven to ten days of annual holiday may be accounted for in this way.

The problem is perhaps peculiarly Japanese because it can arise easily only when the annual holiday is frequently taken piecemeal, as it

is in Japan, where, indeed, many workers are even reluctant to take their full allowance of paid holidays. The compulsory breaking up of the annual holiday has naturally not escaped criticism, for jurists point to the ILO Holidays with Pay Convention (Revised), 1970 (No. 132), which provides that the holiday with pay shall be divided only with official approval, that, unless there is an agreement to the contrary, one of the parts of a divided holiday " shall consist of at least two uninterrupted working weeks ", and that the employer shall consult the worker in fixing the dates of the holiday (Articles 8 and 10). It is also argued that the practice is illegal under the existing regulations.

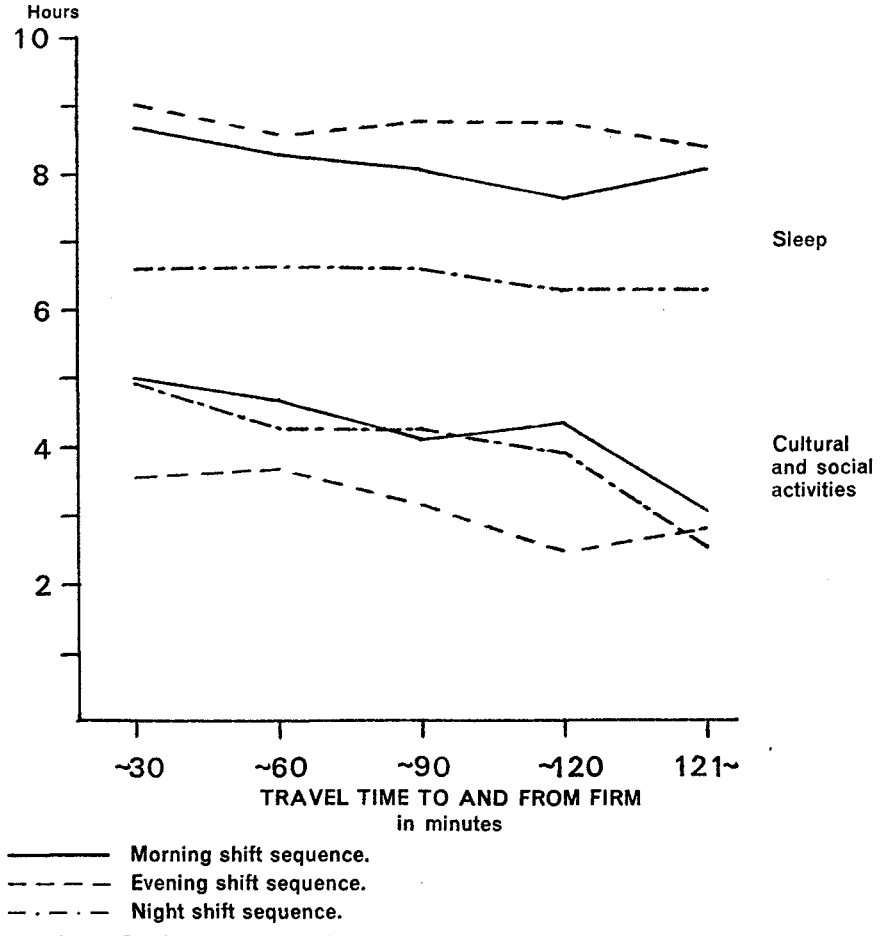
The effect of shift working on daily life

In Japan, as in other countries, the problems of shift working have been the subject of lively discussion, especially in occupational health circles. The large number of experiments and investigations carried out suggest that complete physiological and social adaptation to shift work is not possible. Nobody has been able to define the optimum shift system, and it is generally acknowledged that the difficulty experienced by most workers in obtaining their full period of sleep during the night shift sequence has a cumulative effect and that the disturbance of internal physiological rhythms inevitably leads to chronic fatigue, accident proneness and certain medical complications. There is evidence in particular to show a rather high rate of digestive disorders among shift workers.

Nor is the question a medical one alone, for it is obvious that a worker's being on a shift rota seriously affects his social and family life. Not only is there the difficulty in obtaining the normal period of sleep during the night shift sequence; there is also a disturbance of the worker's spare-time activities. Figure 1 shows the hours spent on sleep and the hours spent on social and cultural activities by workers in pulp and paper factories plotted against the time spent commuting. The spare-time activities of different people follow different patterns, but the figure shows clearly that the general ability of shift workers to participate in social and cultural activities varies during the rotation cycle. The evening shift sequence, compared with the morning, markedly reduces spare-time activities but increases the length of sleep. During the night shift sequence, on the other hand, sleep is reduced by as much as two hours on an average but there is more spare time. Some workers, indeed, make full use of the long spare time characteristic of the night shift by carrying out secondary occupational activities such as farming. Nevertheless these changing routines have an adverse affect, which can be aggravated, as the figure shows, if the worker has to spend long hours commuting.

During part of the rotation cycle lost spare time can be made up only at the expense of sleep. In reply to a recent survey conducted by questionnaire among oil refinery shift workers 82 per cent stated that

FIGURE 1. AVERAGE HOURS OF SLEEP AND CULTURAL AND SOCIAL ACTIVITIES OF SHIFT WORKERS BY TIME SPENT COMMUTING



Source: Results of a survey of pulp and paper factories, given by H. Saito in *Rôdô no Kagaku*, Vol. 25, 1970, No. 12.

they suffered from lack of sleep, 58 per cent that they felt very tired after a night shift, 37 per cent that they felt rather tired and over 50 per cent that they had to pay especial attention to their diet. Although 12 per cent, who engaged in solitary hobbies, liked the shift system, most complained of the disturbance to their family life and their reduced opportunities for taking part in group activities. Other surveys confirm the finding that it is mainly the effects on family and social life that are disliked, though many workers complain that shift working prevents the regular viewing of their favourite television programmes.

Under three-shift systems the changes generally occur at 8 a.m., 4 p.m. and midnight, the two earlier hours being the most likely to vary.

If the night shift is the most unpopular, the attitude to the evening, or afternoon, shift is variable. The evening shift, in fact, has the advantage of allowing long sleep. Under double day shift systems in which women work, as in the textile industry, the shift generally changes at about 1.30 p.m. or 2 p.m. The very early start, generally at about 5 a.m., may be a reason for disliking the morning shift, but certain recent studies suggest that the evening shift is becoming more unpopular because it does not allow a normal evening with family or friends.

Frequency of night shifts

The view formed of a shift system depends largely on the frequency of the shifts that have a bad effect on the health and social activities of the workers concerned. Among these the first to come to mind is the night shift; yet it is not easy to assess its frequency, for many shifts, including normal afternoon and evening shifts, include " night work ", which is legally defined as work performed between the hours of 10 p.m. and 5 a.m. Indeed, afternoon and evening shifts are sometimes known in Japan as " semi-night shifts ".

The night shift, then, has no very sharp identity, but it is a fact that night work is becoming increasingly a subject for collective bargaining. In continuous work the workers demand a change to a four-team three-shift system or some other system that similarly provides more rest days. The night shift is more likely to give rise to disputes when it is irregular or worked by fewer people than a day shift.

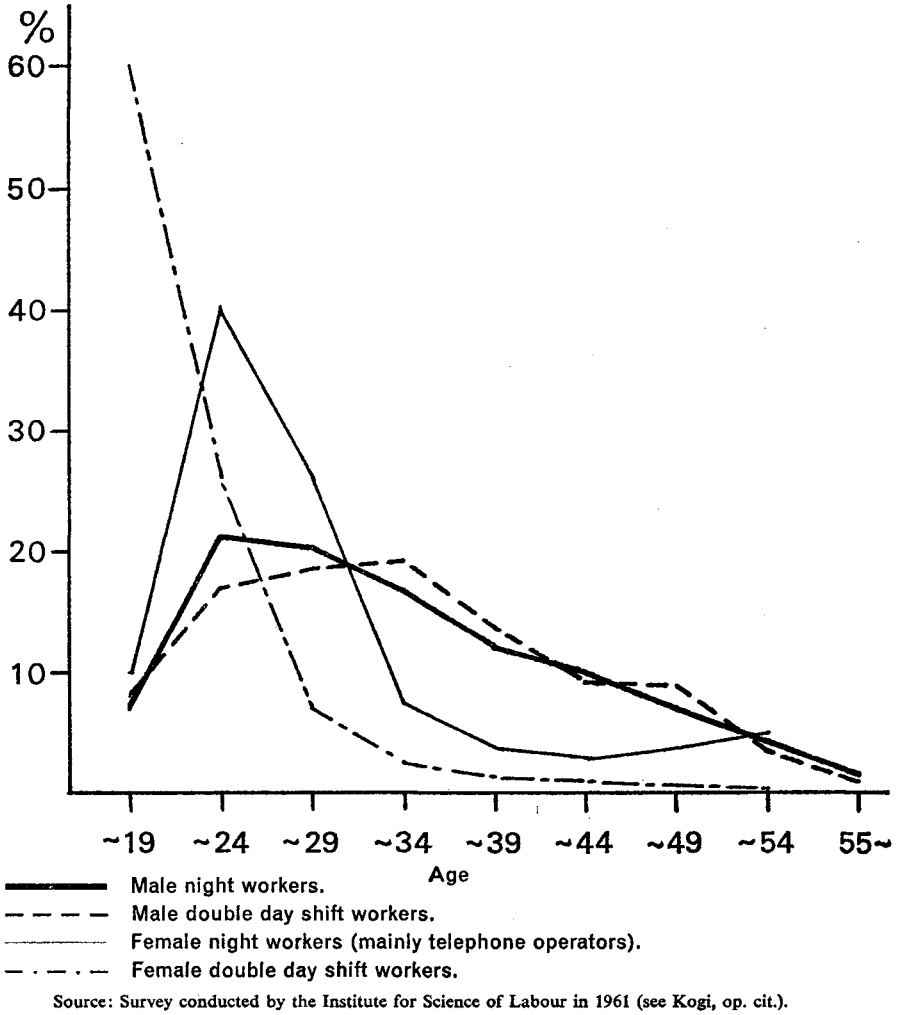
Disputes concerning the frequency of the night shift worked by hospital nurses were the first to raise the matter as one of national importance. Until a few years ago the average number of night and semi-night shifts in the larger hospitals was from ten to sixteen a month. In 1965, however, the National Personnel Authority decided that the frequency of night shifts, including all shifts ending later than 10 p.m., in national hospitals should not exceed eight in the month. Nurses in national and other public and private hospitals then began to claim a reduction in the frequency of their night shifts and by the late 1960s hard bargaining and a few strikes had led to a reduction of the number of night and semi-night shifts to eight or little more in many hospitals.

Nurses, like telephone operators, follow an occupation in which many women work at night, though in both occupations the number of workers on night duty is smaller than the number on day duty. Three-shift systems are the commonest, though they generally involve some supplementary early morning and late evening duties. During the past few years the dislike of night duties has gradually become widespread among women nurses and telephone operators, especially the former. This is due in part to the heavier work load falling on night nurses as a result of the modernisation of hospitals and the increasing shortage of

labour. A questionnaire recently addressed to nurses shows that most of them consider three or four night shifts and the same number of semi-night shifts a month to be a reasonable maximum.

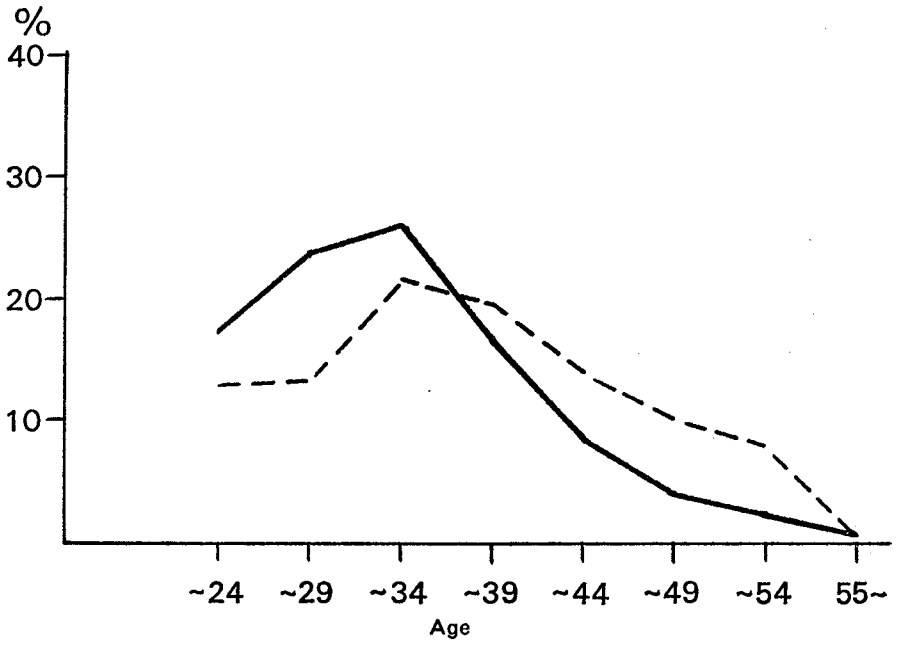
A survey carried out among hospital nurses in 1965 by the Institute for Science of Labour produced interesting results in respect of comparative attitudes to the usual system of three eight-hour shifts and an experimental shift system based on night shifts of twelve or sixteen hours. The experimental system had been introduced by the directors of the hospitals as a means of reducing the number of night shifts. It had fewer

FIGURE 2. PERCENTAGE DISTRIBUTION OF SHIFT WORKERS BY AGE (MANUFACTURING INDUSTRY)



Source: Survey conducted by the Institute for Science of Labour in 1961 (see Kogi, op. cit.).

FIGURE 3. PERCENTAGE DISTRIBUTION BY AGE OF NIGHT SHIFT WORKERS ON LIGHT AND MANUAL WORK



——— Light work (monitoring and machine operation).
— — — — Manual work in workshops.

Source: Results of a survey of pulp and paper factories (see Saito, op. cit.).

night shifts and no semi-night shifts and allowed the nurses more rest days. The survey showed, however, that long night duties in modern hospitals had a marked effect on the condition of the nurses. Nurses on the twelve-hour or sixteen-hour night shift had a slower heartbeat and lower temperature at midnight than those on the ordinary eight-hour night shift, and there was a reduction in alertness and other aspects of performance. It was found that the experimental system was appreciated by the nurses for its slighter disturbance of the regularity of life and the greater possibilities it presented for short periods of sleep during the night, but that this was more than offset by dissatisfaction with the long hours of night duty and that in any case some found it no more convenient than the established system.

Only 4 per cent of the nurses questioned actually preferred the experimental system, while 56 per cent frankly disliked it. An unspecified majority were of the opinion that less frequent night and semi-night shifts should be achieved within the established three-shift system. Two-thirds complained of the bad effect of fatigue on their attitude to family

or friends. Some also complained of difficulty in finding the time for social activities, for individual training, or even for companionship.

These reactions are probably indicative of a growing dislike for night work. Workers seem to be more sensitive than ever to interference with their family and social life, and some writers suggest that the younger generations are beginning to turn against shift work.

Figure 2 shows a remarkable difference in 1961 between the ages of male and female workers in manufacturing. Most of the girls making up the very high percentage of female double day shift workers under 20 worked in textile mills. The textile industry has been employing large numbers of young girls as they leave lower secondary school, but it is now facing a shortage of labour. Similarly, it is becoming more difficult to recruit young men for strenuous night work, as can be seen from figure 3, which, like figure 1, is based on a recent survey of pulp and paper factories. Although the results of figures 2 and 3 are not readily comparable, it is interesting to note that the 1961 survey shows 48 per cent of male night workers in manufacturing as being under the age of 30, whereas the more recent one shows 41 per cent of those on light work and only 26 per cent of those on heavier work as being under 30.

Some future trends

Recent changes in the organisation of shift work in Japanese industries suggest the necessity of reducing night work rather than merely alleviating its drawbacks. The social and medical implications of shift work do not seem to have been properly grasped and the lack of legal and administrative regulations is not, perhaps, surprising.

In coming years concern for the health and welfare of shift workers is bound to increase. A point worth noting in regard to organisation, however, is the difficulty of changing an existing system. Even when there is widespread pressure in favour of shorter hours of work it takes time to achieve a suitable change in the shift system, and it very often happens that a three-shift system with only three teams is maintained—thanks to regular overtime—although weekly hours of work have been reduced to forty-two or so. Reduced hours of work are certainly the chief factor in improving shift work, but when agreement is reached on reduced hours of work the actual hours worked on the shift rota are generally longer, as is shown by the experience of the iron and steel industry. Recent important changes in shift systems, in fact, take account not only of reduced hours of work but also of the present serious shortage of manpower.

An inquiry conducted among management and union leaders by the Japan Productivity Centre in 1969 [1] threw light on attitudes to shift

[1] See *Chingin Jijo*, No. 1348, 1969.

work. Most heads of firms considered it necessary, though nearly two-thirds of them admitted that it could give rise to difficulties. More than 40 per cent of the union leaders were against introducing it, and about 10 per cent were against it in any form. Only 9 per cent welcomed it, but 35 per cent thought it was necessary despite the difficulties it involved and the need for preliminary study. This rather negative attitude was shared by leaders of various unions, including independent unions, and seems to have been among the reasons for their actively seeking shorter hours of work.

The same inquiry showed that 76 per cent of the union leaders considered forty hours of work a week or less to be suitable and that 51 per cent of the heads of firms supported them. The lack of a serious difference of opinion on the reduction of hours of work was in sharp contrast with the marked differences on shift work.

It is clear at any rate that shift working is not looked on as an inescapable element in technical progress and social development. This may have some connection with the changing attitude of public opinion towards economic growth in the face of the modern degradation of the environment. Workers regard shift work as a source not of new jobs but of disadvantages to be avoided if possible.

One of the principal claims of the spring 1971 Joint Struggle Committee of the trade union organisations was that shift systems or night work applied for economic reasons should be refused. Another, coming under the heading of hours of work, was that the conditions of shift workers should be improved, particularly through a reduction in their hours of work. The Committee also called for the extension of the four-team three-shift system. It added that when actual hours of work were reduced intensification of work should be avoided and that the change to the four-team three-shift system should not take place without the necessary additions to the staff.

Against the background of the present situation an attempt will now be made to foresee some probable trends of the future. They fall conveniently into the following four groups:

(1) The general reduction in hours of work will increasingly affect shift workers and hasten the change to new shift systems. The four-team three-shift system will be the most usual in continuous operations. Semi-continuous and discontinuous shift systems will gradually come to be based on a five-day week.

(2) The new shift systems will not come into effect without disputes over the legislation and regulations governing shift work. Attention will be given to a broader legal definition of night work, to the restriction of night work, to the limiting of overtime worked by shift workers, to the improvement of the regulations governing days of rest in shift work, to suitable breaks during shifts, to welfare facilities for shift

workers, and to the medical examination of shift workers before employment and regularly during their career. The need for specific regulations will become increasingly obvious.

(3) In planning the rotation cycle more attention will be paid to the social implications of shift work. The effects of shift work on the worker's social life are an important element in his general dissatisfaction and if they are not taken properly into consideration there will not be enough workers willing to perform shift work. Since rotation cycles and other secondary features of shift work are very unlikely to be the subject of legislation they will have a bigger place in consultations with the trade unions. The protection of the social and family life of shift workers will be considered more important than increases in the extra pay they receive for shift working.

(4) Discussions concerning shift work will concentrate more on the frequency of night shifts or other shifts that may affect the worker's condition. Such discussions have already started in respect of the night work of women, and future issues will include the indispensable reduction of night work in industry. Shift working naturally facilitates production economies and the expansion of employment, but a broader social view will have to be taken. The difficulties that workers have in adjusting themselves to shift work are of a kind that can be dealt with fundamentally only by reducing the frequency of undesirable shifts. The matter will have a place in general discussions on the reduction of hours of work, but it will more often be dealt with independently.

The trends described above correspond to a rapidly growing concern about the problems of shift work, problems that were long ignored outside collective bargaining. The view is now firmly put forward that the whole question in all its medical, sociological, economic, psychological and other aspects must be taken into consideration in the planning of shift work.

Nevertheless, a social approach to an individual shift-work scheme is not easy. Management and unions often try to refer to independent or academic groups, but experience in industry shows that the specialist approach is not satisfactory. It is hard to find suitable specialists and harder still to be sure that their views will be sound.

In a recent dispute concerning the single-driver plan for electric and diesel locomotives on the national railways hard bargaining took place on the question of night shifts, for there have recently been more night trains than before on account of the dense railway traffic and the increased number of railcars. A report by five specialists in medicine, psychology and human engineering supported the single-driver plan for all trains whether running by day or by night. The report was criticised not only by unions but also by scientists for lack of scientific basis and neglect of the effect of an increasing night workload on safety and

family life. The committee of specialists had been asked by management and labour to produce expert findings acceptable to both sides, but, although it subsequently revised parts of its findings, particularly in respect of night trains, it failed in its mission. The report was issued in April 1969, and another half-year elapsed before the dispute was settled, so that there were inevitably repeated strikes by the drivers. An agreement was finally reached that eliminated trains on journeys of over two-and-a-half hours ending after 1 a.m. or starting before 5 a.m. The complications of this affair show how problems can arise in shift work and how great the need is for careful study.

In conclusion it can be said that shift work will continue to present the problems of a double adjustment: physiological adjustment, with its medical implications, and adjustment to reorganised social and family life. Shift workers have to change the routine of their daily life, but it would be unfair to say that they all dislike shift work, for they do to some extent adapt themselves to the rotation cycle. Nevertheless, even a well-balanced rotation cycle fails to eliminate the clash between the rhythm of society and that of the shift worker, there does not appear to be an optimum shift system, and the workers' antipathy to night and shift work is growing, a fact that has to be taken into account.

Shift work cannot be avoided, but it must not be planned in accordance with purely economic reasoning. The aspects of the question that are not susceptible of economic measurement must be taken into account if the workers are to be able to adjust themselves. If it is accepted that shift work so organised as to allow the basic rhythm to be maintained is preferable from the physiological point of view, the same attitude must be adopted towards the social aspects of shift work. For the sake of the individual and of society ways and means must be found of reducing the number and duration of shifts that can have a harmful effect.