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International regulations on the organization of shift work

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Changes since the early 1990s in international regulations on night and shift work were reviewed, including changes in complex shift systems, greater flexibility, increased female participation in night work and attention to health effects. Recent international regulations have focused on (i) a broadened scope of regulatory measures treating both genders equally, (ii) multifaceted protection, and (iii) consultation weighing many aspects of job design. The application of these international regulations depends on national laws and practice, with possible derogations. It calls for local support measures, including (i) guidelines for enterprise-level consultations on shift schedules, (ii) promotion of health and safety measures, and (iii) participatory strategies for locally adjusted shiftwork arrangements and social support.

Key terms European directives, female night workers, flexibility, international standards, night work, night workers, participation, resting time, safety and health protection, shift schedules.

Changes in international regulations on night and shift work took place in the early 1990s. These changes reflect the renewed interest in shorter workhours and flexible worktime arrangements (1). Most new worktime patterns, deriving from the diverse business demands and worker preferences of today, are associated with changes in approaches to night and shift work (2—4).

Related trends in shift work include (i) increasingly complex shift systems, (ii) greater flexibility in covering extended operating hours, (iii) increased participation of female night workers, and (iv) attention to health effects (4, 5). These trends are more clearly seen in most industrialized countries, but they are more or less common also in many developing countries. It is of particular interest that the trends are based on the changing views of how to regulate night work (1).

To understand this problem, we can look at the following 3 aspects emphasized by recent international regulations on night and shift work: (i) a broadened scope of regulatory measures treating both genders equally, (ii) multifaceted protection, and (iii) consultation weighing many aspects of job design.

Scope of recent international regulations

The international debate leading to new international labor standards (ILO convention no 171 and ILO recommendation no 178) concerning night work has broadened the scope of regulatory measures to apply to both genders and to nearly all occupations (1). This broadened scope has been made necessary, above all, by the increasingly complex forms of shift work patterns that are apparent in all industries and in both industrialized and developing countries.

Complex worktime arrangements derive from both social and economic changes. Greater flexibility in shift work arrangements, increasingly dominant in industrialized countries, relate to diverse business demands resulting from competitive pressures and rapid technological change and workers' preferences about the timing of work (4, 6). The appearance of complex combinations of different categories of worktime arrangements, such as a combination of full-time semi-continuous shifts and part-time weekend shifts, is linked with the decoupling of business hours from individual workhours. Many

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innovative patterns are associated with shorter workhours and diversifying career needs.

Similarly diversifying patterns have come to be seen also in many developing countries. For example, in Thailand, various types of shift systems are found, particularly in manufacturing industries, as shown in table 1 (7). Of the 96 systems adopted by the enterprises surveyed, 10 were continuous systems with varied cycle periods, half of them rotating anti-clockwise. There were 84 systems, or 88%, operating on a semi-continuous or discontinuous basis. Among these semi-continuous or discontinuous systems, 72 had only 1 weekly holiday. Shifts were alternated every week among most of these semi-continuous or discontinuous systems, but there were 9 systems in which the shifts were rotated every 2 weeks. Of about one-third of all the factories having discontinuous systems, half had double day shifts and the other half had day and night shifts separated by an interval of a few hours, which are often filled by overtime work. Various continuous and discontinuous systems are also spreading to the service sector in developing countries.

Table 1. Different shift systems adopted in a survey of the manufacturing industries in Thailand.

Shift system	Days off per week			Total
	One	Two	Three	
Fixed system	2	-	-	2
Discontinuous system[a] (2-team, 2-shift)				
Without between-shift interruption	13[a]	1	1	15
With between-shift interruption	15[b]	3	1	19
Semi-continuous system[c]				
2-team, 2-shift	2	-	-	2
3-team, 3-shift	42[d]	4	2	48
Continuous system				
4-team, 3-shift	-	-	-	10

[a] Of the 13 systems for "without between-shift interruption" and 1 day off per week, there was 1 system in which the shifts rotated every 2 weeks.
[b] Of the 15 systems for "with between-shift interruption" and 1 day off per week, there were 4 systems in which the shifts rotated every 2 weeks.
[c] All the discontinuous and semi-continuous systems except those explained had weekly rotation of shifts.
[d] Of the 42 systems for "3-team, 2-shift" and 1 day off per week, there were 4 systems in which the shifts rotated every 2 weeks.

Table 2. Two views of night work in international regulations (taken from reference 1). (ILO=International Labour Organisation)

	Traditional view (ILO convention no 89 and others)	More recent view (ILO convention no 171)
Main purpose	Prohibition of night work for a specific category of workers	Improvement of conditions of work for night workers
Scope	Women and industry	Both men and women and all branches and occupations with a few limited exceptions
Definition of night	Specified period (at least 11 consecutive hours including at least 7 consecutive hours between 2200 and 0700)	Specified period (at least 7 consecutive hours including the interval between 0000 and 0500)
Focus of attention	Any work during the prohibited period	Workers performing a substantial amount of night work

These trends have resulted in fundamental changes in the concept of night work and that of night workers (1). The changes are apparent in the definitions used in convention no 171 of the International Labour Organisation (ILO). It should be noted that the new definitions were developed through an intense procedure involving governments, employers and workers, and they reflect recent shiftwork research. Thus attention is drawn to the 2 views of night work indicated in table 2. The traditional view defines night work as any work during prescribed hours, thus referring to specific night hours for restriction or compensation purposes. This view, typically represented by the Night Work (Women) Convention (no 89) of 1948, has been seen in many national regulations that prohibit night work for women or young persons. The more recent view on night work focuses on night workers who do night work substantially and therefore need particular protection. The new view is thus linked with the safety and health of night workers and other measures required for improving the quality of their worklife.

The specific measures provided by convention no 171 cover a broad range, as shown in the upper part of table 3. They include health assessment, appropriate medical advice, transfer to day work, maternity protection, compensation in the form of worktime or benefits, appropriate social services, and consultation of concerned workers' representatives. These measures apply to night workers who work at night to a substantial degree. Night is defined as a period of at least 7 consecutive hours, including the interval from 0000 to 0500, to be determined by the competent authority after consultation with the most representative organizations of employers and workers or by collective agreements. This is shorter than the period in earlier standards, such as convention no 89. Night workers are employed persons whose work includes a substantial amount of night work exceeding a specified limit.

Additional measures suggested by recommendation no 178, shown in the lower part of table 3, can be a good basis for designing shift schedules. They include limits on normal workhours, avoidance of overtime and of double shifts, minimum rest periods of at least 11 hours between shifts, breaks, social services, transfer to day work in special situations, training opportunities, early retirement, and others. The limit of 8 hours for normal hours of work in any 24-hour period in which night work is performed does not apply when work includes substantial periods of mere attendance or stand-by, when alternative schedules give workers at least equivalent protection or in cases of exceptional circumstances.

Table 3. Specific core measures required for night workers by the ILO convention concerning night work (no 171) and the recommendation concerning night work (no 178), both published in 1990. (ILO=International Labour Organisation)

Area	Measures to be taken
Convention no 171	
Health assessment or advice	Health assessment and advice on how to reduce or avoid health problems associated with night work (i) before assignment, (ii) at regular intervals, and (iii) when experiencing work-related health problems
Transfer to day work	Transfer to similar job when certified as unfit for night work
Maternity protection	An alternative to night work before and after childbirth for at least 16 weeks and for additional periods necessary during pregnancy, with protection as to no dismissal and income
Compensation	Compensation in the form of worktime, pay or benefits
Social services	Appropriate social services
Consultation	Consultation on the details of schedules, health and social services before work schedules involving the services of night workers
Recommendation no 178	
Hours of work	Normal hours of work not exceeding 8 in any 24-hour periods; avoiding overtime and no overtime in occupations involving special hazards or heavy physical or mental strain; no consecutive full-time shifts; at least 11 hours between shifts
Maternity	Assignment to day work as far as possible at any point during pregnancy
Social services	Services to reduce transport time, improve quality of rest, enable workers to obtain suitable meals and beverages, overcome constraints on family duties or cultural and recreational activities
Training	Benefit from training opportunities, including paid educational leave like other workers
Transfer	Special consideration for transfer to day work for workers with a given number of years of night work
Retirement	Special consideration for voluntary early or phased retirement

These standards were adopted with a clear intention to apply them to both men and women. Together with these standards, ILO adopted the protocol of 1990 to the *Night Work (Women) Convention* (no 89) of 1948, under which national regulations can permit night work by women in industry under defined conditions. Variations can be introduced to the duration of the night period defined by convention no 89, which mentions a period of 11 consecutive hours. Exemptions can also be introduced to the prohibition of night work by women, while the conditions for introducing the variations or exemptions are strictly defined and should include specified protection for female workers during a period before and after childbirth. In this way, the protocol allows some countries to reconcile their desire to protect women with considerations of equality of opportunity and competitiveness.

These new international labor standards express a general consensus that specific, multifaceted measures should be taken for workers performing night work to a substantial degree, irrespective of gender. A related background view relates to the recognition of the need to have greater flexibility in organizing night and shift work (4, 6). The increased emphasis on the safety and health protection of night workers is of special interest, as the consensus is apparently built with the understanding that flexible schedules should not compromise safety and health.

Table 4. Core provisions of European Council directive 93/104/EC.

Area	Measures to be taken
Organization of work	
Daily rest	A minimum daily rest period of 11 consecutive hours per 24-hour period
Breaks	A rest break where the workday is longer than 6 hours
Weekly rest period	A minimum uninterrupted rest period of 35 hours per each 7-day period
Weekly worktime	Maximum workhours of 48 per week
Annual leave	At least 4 weeks of paid annual leave
Night work	
Length of night work	Average 8 hours in any 24-hour period
Health assessment	Free health assessment before assignment and at regular intervals
Transfer to day work	Transfer whenever possible to day work when suffering from health problems recognized as being connected with night work
Other night work matters	Certain guarantees for workers incurring risks to their safety and health linked to night-time work; notification to the competent authorities about regular use of night workers
Night and shift work	
Safety and health	Safety and health protection appropriate to the nature of night work; appropriate protection and prevention services or facilities with regard to the safety and health equivalent to those for others
Pattern of work	Account taken of the general principle of adapting work to workers, with a view, in particular, to alleviating monotonous work and work at a predetermined work rate, and of safety and health requirements, especially regarding breaks during worktime

Review of the European directive

The European directive 93/104/EC also emphasizes the need for multifaceted protection. This emphasis is in accordance with recent national regulations that have been developed in some European countries to consider the need for flexibility and pluriformity (8). The core provisions of the directive are simple and clear, as shown in table 4. As in the case of international labor standards, the directive provides specific measures relating to the scheduling of shifts and resting time, safety and health protection, and related services (8, 9). They include a minimum daily rest period of 11 consecutive hours, one 35-hour period off every 7 days, maximum workhours

of 48 per week and 4 weeks of paid annual leave, all of which apply to both day and shift workers. For night workers, the directive provides an average of 8 hours in 24, a maximum of 8 hours in hazardous or physically or mentally straining jobs, health assessment before starting and at regular intervals, transfer when suffering from relevant health problems, appropriate safety and health protection and prevention services, and facilities for safety and health equivalent to other times.

It is noteworthy that the provisions of the European directive are extensively qualified by definitions of reference periods (time periods over which the limits in the directive should be achieved) and derogations. The reference periods are essentially 14 days for the weekly rest period, 4 months for maximum weekly worktime and, for the length of night work, a reference period defined after consultation of the 2 sides of industry or by collective agreements or agreements concluded between the 2 sides of industry at the national or regional level. The derogations, or permissible exceptions, appear to apply to most of the provisions except the health checks and the provision of safety and health facilities. They can be based on a wide variety of grounds related to jobs (eg, security guards), industries (eg, press, radio, television) or circumstances (eg, each time the worker changes shift and cannot take daily or weekly rest periods between the end of 1 shift and the start of the next).

Clearly, the European framework is an important step in setting common minimum standards in the organization of shift systems. In many European countries, the directive is leading to revisions of existing national laws (8). This is important as the new revisions reflect the spreading recognition of the need for protection of shift workers in a multifaceted manner.

Of particular interest is the EC court review of directive 93/104/EC questioned by a member country. The United Kingdom, arguing that the directive is more of a social measure and so should have required unanimous approval, has not accepted it, and it has appealed the case in the European court. This was an important hearing.

Table 5. Problems and the change process in 26 cases of shift system changes (taken from reference 3).

	Cases (%)
Problems	
Extension of business	73
Flexibility at work	77
Shorter workhours	58
Engagement of part-timers	62
Reorganization of work	88
Change process undertaken	
Group study of problems	88
Data analysis of surveys, etc	54
Planning scheduling options	85
Collective consultation	100
Training about shift work	42
Test periods of new schedules	65

The EC court, in its judgment on 12 November 1996, confirmed the need for the regulating measures in the EC directive (9). The judgment took into consideration the contribution of these regulatory measures to the improvement of the health and safety protection of night and shift workers (5).

Implications for shiftwork research

An important argument for these regulations is the need for health and safety protection of "night workers" performing a substantial amount of night work. The argument is used for provisions about normal hours of work, rest periods (at least 11 hours between shifts, etc), health services, transfer to day work, maternity protection, social services, and consultations.

The need for international regulations is further justified by the fact that the views of employers and workers are often conflicting about the introduction of night and shift work (4, 6, 10). Trade unions insist that economic reasons alone should not be a sufficient justification for introducing shift work and that shift work could be harmful to the health of workers and disruptive to their family and social life. Employers maintain that, while certain workers may have difficulty, there are no general harmful effects and that night and shift work have positive effects on employment, economic growth and the standard of living. Thus many reports show that, when shift schedules are applied, several options are compared to find a workable pattern. It should also be noted that there are trade-off situations in which workers tend to accept flexible operating hours in return for shorter hours or better services. International regulations cannot guide employers and workers in details of these various options, but nevertheless they can present minimum conditions under which these options should operate.

Reports from different countries show that this change process was more successful when it was provided with concrete support. Such support is useful, particularly when it can provide employers and workers with facts and data about how to select shift schedules, assist in their operation, and help promote participatory development of potential options for informed bargaining. As indicated in table 5, examples of changing shiftwork arrangements reported in an ILO survey (3, 6) show that the main problems dealt with in collective bargaining were common. The 26 cases concerned the introduction of combined systems or the application of flexible hours of work or job-sharing schemes. Combined systems meant a combination of different categories of systems, such as a combination of a full-time shift system and a part-time system. In the majority of these cases, scheduling changes had been proposed as a means of

extending business hours and increasing flexibility at work. Part-time schemes or the shortening of workhours were also of concern in the majority of cases. It is interesting that, in most instances, it became necessary to reorganize the work in accordance with the shiftwork changes.

As table 5 shows, the main steps taken in dealing with these problems were also complex. Consultation between management and workers took place in all cases, and a group study of the existing situation was undertaken in 88% of the reported cases. An analysis of data specifically gathered for such group study was done in more than half of the cases. The planning of available options was also a common step. Training sessions for managers and workers were organized in 42%, and 65% had test periods for a new scheme.

The support for this participatory process of changing shift systems will need to be developed. Such support is necessary in both industrialized and developing countries, where the changing process is similarly complex. In the aforementioned survey in Thailand, problems arising from shift work in the 93 enterprises concerned a wide range of managing issues (7). Examples included the sleepiness of workers (mentioned by 38%), machine repair at night (25%), higher absenteeism (24%), nonappearance of workers (21%), lower productivity on unfavored shifts (17%), higher sickness rates among shift workers (15%), and higher accident rates (9%). It is clear that, for improving shiftwork conditions, these enterprises require direct support concerning locally adapted shift system changes and managing measures, and also information on well-informed consensus building in the participatory process.

Furthermore, international regulations are often directly relevant to the management of shift work (11—13). The minimum requirements for shift schedules seem particularly important (1, 14). This is exemplified by frequent resort to double full-time shifts in many countries where these international regulations have yet to be applied. Table 6 gives examples of double and triple shifts worked during a 10-day period in a glass factory. It is striking that such doubling of shifts was worked very frequently, resulting in the obvious overstrain of workers. The need for applying the minimum international standards, as suggested by recommendation no 178 or the European directive, is apparent.

The application of these international regulations depends on national laws and practice, with possible derogations. It calls for research into (i) improved work schedules, including the need to respond to increasing flexibility, (ii) practical measures for multifaceted protection, and (iii) participatory processes of consultation and worker involvement. The future research topics suggested on the basis of these 3 aspects are listed in table 7. In relation to work schedules and flexible patterns of shift work, research is needed to develop scheduling guides, appropriate resting conditions, and work organization. With respect to multifaceted protection, safety and health measures are important topics for research. Among these measures, particular attention is drawn to health assessment and advice about coping measures, work redesign for making night and shift work safer, social support, and maternity protection. In addition, research will be needed to develop direct support for management-worker consultation and for developing an action-oriented participatory strategy that takes into account the relevant aspects of international regulations on shift work.

Table 6. Double shifts during a 10-day period among 3-shift workers in a glass products factory in Thailand, from a case report in 1994. [M = morning shift (0700—1500), A = afternoon shift (1500—2300), N = night shift (2300—0700), H = day off, A+N and M+A = double shifts of 16 hours, M+A+N and N+M+A = triple shifts of 24 hours]

Worker	Shift schedule									
Female, age 24, married	A	N	N	H	H	H	M	M	M	M
Female age 27, married	A	H	A	A	H	H	M	M	M	H
Female, age 28, married	A+N	N	A+N	A	M	M	M+A	A+N	A+N	M
Female, age 32, married	M+A	M+A	M+A	M+A+N	N	N	H	H	M	M
Female, age 35, married	N	N	A	M	M+A	M+A	A	A	M	M
Female, age 20, single	M	M	A	A	N	N	H	H	M+A	M
Female, age 34, single	A	A	N	N	H	H	M	M+A	M+A	M+A
Male, age 20, married	N+M+A	N	H	H	M	M	A	A	N	N
Male, age 25, married	A	A	N	N	H	H	M	M	M	M

Table 7. Future research topics for night and shift work in relation to the development of international regulations.

Area	Development of international regulations	Future research topics
Work schedules and flexibility	Hours of work and overtime	Scheduling guides
	Rest periods and breaks	Resting conditions
	Transfer to day work	Work organization suited to individual career
Multifaceted protection measures	Health services for night workers	Health assessment and advice on coping
	Safety measures	Work redesign
	Social services	Social support
	Maternity protection	Maternity protection
Consultation and worker involvement	Consultation about work schedules	Consultation support
	Rights of workers	Participatory strategy

Concluding remarks

Recent developments confirm the need for upgrading and widely applying international regulations, especially in respect to their contribution to improving the health and safety protection of night and shift workers.

It is important to know the limitations of these international regulations and concentrate on scheduling

strategies and health-related measures and on the participation rights of workers. As discussed, the application of these international regulatory measures depends greatly on national laws and collective agreements. It calls for local support measures including (i) guidelines for enterprise-level consultations on shift schedules, (ii) promotion of health and safety measures, and (iii) participatory strategies for locally adjusted shiftwork arrangements and social support. It is vital to promote these support activities on the basis of existing international standards and to develop shift schedule guidelines, health and safety protection services, and, above all, participatory strategies for locally adjusted, well-informed consensus building towards more appropriate arrangements of shift work under different national conditions.

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