Session 2
Paper (a)

SHIFT WORK AND OCCUPATIONAL HEALTH

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Shift work is an invisible problem facing occupational health services. Shift-work agreements are usually linked to pay awards, and are negotiated through the usual industrial relations processes of mediation and discussion. Rarely is the occupational physician either asked which shift pattern is best, or consulted about changes to shift work: he has to make a special effort to be heard. The usual deciding factors in establishing shift work patterns are whether the workers are prepared to work those particular shifts (perhaps motivated by productivity incentives or lack of any employment alternatives), and what financial benefit the pay award linked to shift work will bring them.

The occupational physician is usually only consulted under certain circumstances:

1. The shift-work award is being negotiated, and one side or the other wants information that may support their arguments.

2. When day workers are undergoing medical screening for their fitness to undertake shift work.

3. When a spate of accidents, illnesses, or medical retirements cause concern to management or
staff or both that shift work may be affecting workers' health.

4. A request from the personnel department to assess a "problem worker", who is not coping with shift work for some reason. The worker could be suffering from the so-called 'chronic time shift maladaptation syndrome', which we discuss in more detail later.

All too often, it is left to an insightful occupational physician to find out for himself how the worker in his company fares while working shifts, and then to take the initiative in evaluating problems and discussing them with the company and union, usually through the Health and Safety Committee.

In Europe and North America, about 25% of manual workers and 22% of the total workforce are required to work hours outside the regular nine-to-five pattern. In Australasia, shift work is relatively less common: 22% of the manual labouring workforce are shift workers.

Shift workers and their occupations fall into a number of recognisable categories.

- **Workers in continuous technological processes**
  These people, working in steel production, refineries, furnace work, offshore oil installations, power generation, and chemical processing, are a major group of shift workers. In this group, the penalty for stopping the process is technological: shutting down a furnace or pumping station would involve major interference with the process of restarting. Furnaces may crack with repeated cooling and heating; fuel lines may solidify and block up. Some chemical processes are continuous, in that each step depends on the prompt arrival of substrates from the immediately previous process. The need for 24-hour coverage is obvious.

- **Workers in vital public services**
  Among the workers in this category are medical ambulance workers (officers, drivers, and nurses); those involved in fire services, transportation, and communications; and water and power distribution engineers.

- **Workers in various marketplaces**
  These people are faced with stressful shift work hours owing to consumer demands. The point here is not that consumers require their services at times outside normal working hours, as much as it is the very nature of the job to work shifts in order to meet deadlines dictated by consumer demand. Examples include those working in fishing, baking, food distribution, television, daily (particularly morning) newspapers, and international finance.

- **Workers of machinery/technology**
  In fields where the high capital costs or rapid obsolescence of machinery make it economically necessary to work "around the clock" to amortise high purchase costs (e.g. computing), workers may also be required to work shifts, particularly through the night. This last group is changing in nature: the "traditional" characteristics (lower class, male, manual workers) are disappearing. There is an increasing proportion of shift workers who are middle class, computing personnel, and of either sex.

  The converse is seen in underdeveloped countries, where the cost of labour is so low, in comparison to the capital costs of even normal plant or equipment, that it is commonplace for factories to be worked around the clock to maximise output and increase profitability. This may not necessarily be exploitative, because it increases employment, and therefore increases the incomes in that area. It may also be the only way that companies in poor countries can afford to purchase machinery that can reduce human workload by mechanisation or automation.

- **Permanent night-shift workers**
  These workers are placed under great amounts of occupational stress:
  - night nurses

- watchmen, night porters, and security guards
- cleaners
- maintenance crews

- **"Nocturnal" shift workers**
  Workers who have no distinguishable night or day may suffer stresses related to circadian rhythm disruption:
  - space-station workers
  - Antarctic scientific (and now industrial) operations
  - underground workers: the archetypal group is miners, but now there is also a special group of military personnel, manning underground missile and other installations

The way that workers respond to shift work is complex. The results from most studies show that 50-75% of workers have some degree of sleep disturbance, and that they rate their sleep as being unsatisfactory even after five years of shift work. This is often as much due to such unsatisfactory sleeping conditions as noise, light, and intrusion by children as to circadian rhythm problems per se. In addition, studies cite that 25% of workers experience some degree of social penalty as a result of working shifts.
The principal concerns held by shift workers seem to relate to three areas, namely subjective fatigue, social effects, and circadian rhythm maladaptation. In contrast, the occupational physician has different concerns, primarily related to injury from accidents at work, morbidity (peptic ulcer symptoms or problems with medication), and mortality (notably from ischaemic heart disease), which may arise from any or all of the health consequences of shift work.

Not only do the benefits of shift work decline in middle age, but the health costs increase too. Workers over the age of 45 show a natural age-related decline in ability to sleep: sleep length and quality reduces, and tolerance for circadian rhythm disruption and fatigue is significantly impaired. Increasing numbers of workers of this age, who had previously experienced no or minimal problems with fatigue or sleep, become unable to sleep or to recover from prolonged or irregular work. This leads to the worker deciding to quit shift work, especially if the perceived benefits have also declined.

Fatigue and Disrupted Sleep in Shift Workers

Fatigue is either due to prolonged work or disturbed sleep. The latter may be due to poor environmental conditions such as heat and noise, or endogenous factors such as time-zone changes.

Mental fatigue may be:
1. Transitory - i.e. immediately following a period of duty.
2. Cumulative, due to:
   a) Delayed or incomplete recovery (poor rest conditions, poor quality sleep, or inadequate duration of a rest period).

b) Excessive workloads while on duty ù this will be determined by the complexity, difficulty, uncertainty, and time pressure of tasks.
c) Recurrent work periods with insufficient periods of recuperation.

Cumulative fatigue may be short-term (days), or long-term (months).

Some likely effects of fatigue:
- subjective tiredness
- impaired coordination
- short-term memory impairment
- slowed responsiveness
- poor vigilance
- greater tracking errors
- monitoring fails to detect errors
- low levels of frustration and anger
- morale and motivation falls
- loss of flexibility and adaptability
- hostility, disorientation, perceptual changes, and difficulties in concentration
- reduced crew cooperation

Performance declines with prolonged duty periods. As the person becomes more fatigued, not only is the initial performance less good, but the ability to sustain that level of performance declines rapidly over a few minutes. Both mental and physical tasks also take a great deal longer to execute. What is more important is the effect of cumulative fatigue, and scheduling to avoid this is more important than limits on shift duration alone.

Partial sleep loss leading to cumulative fatigue may be due to inadequate duration of rest periods (taking into account the effect of circadian rhythms on sleep quality), or poor sleep due to poor environmental conditions, or disturbed sleep where a complete sleep cycle is not achieved due to early awakening.

Personal factors affecting performance in the sleep-deprived person are:
1. High interest and motivation
2. circadian dysrhythmia and normal circadian rhythm decrements interact synergistically with sleep loss effects on performance.
3. Physical exercise - activity helps to overcome the effect of sleep loss
4. Stimulants
5. Smoking and physical fitness.

It is very difficulty to define what is an acceptable degree of sleep loss - there are demonstrable differences in performance and sensitivity to added sleep loss in those who are endogenously short sleepers and poor sleepers. One problem is that functional impairment due to fatigue tends to be underestimated or disregarded. Prolonged total sleep loss over several days, such as may occur in military operations, may lead to extreme disruption of performance, but also of major concern is the onset of drowsiness and involuntary microsleeps. These

microsleeps will lead to total sleep if the sleeper is not aroused. They do not appear to have any restorative effects, like napping does.

Recovery from sleep loss is rapid and is reached within 16 hours, during which time there are longer periods of deep and REM sleep. However, mood changes and subjective malaise may persist for several days. The drive to "recovery sleep" that usually occurs on weekends after a period of shifts overrides the lack of sleepiness due to the circadian rhythm shift, but only on the first night. Irregular sleep, usually with associated partial sleep loss, has problems related to the disruption of normal routines, circadian rhythms, and possibly cumulative fatigue.

There is always some reduction in performance on being wakened from a normal night's sleep, and the effect is greater the longer one has been asleep. The more complex the performance required, the longer this effect will last, and delays of 20 minutes following rousing can be expected for complex functions. This delay can be heightened by cumulative fatigue. Being awoken during recovery sleep after sleep loss may slow full awakening even further. It seems that a quiet period on arousal of a few minutes will speed recovery, and sudden awakening and action, as often occurs in military situations, is particularly disruptive.

Sleep inertia is observed when sleepers are awoken while in the deep sleep phase, causing prolonged dysphasia and mental impairment. This is usually only likely to occur if sleep has been more than 35 minutes and less than two hours. Sleep inertia is one reason for the effectiveness of napping for very short periods over longer sleeps, which will leave workers feeling or performing badly on awakening.

The Effects of Shift Work

We will discuss the effects of shift work under four major headings, namely sleep deficit and fatigue, social effects, circadian rhythm disruption (dysrhythmia), and medical consequences.

Sleep Deficit and Fatigue

In most countries, shift workers do not work longer hours than day workers in manual occupations. However, several things must be remembered:

1. Manual workers tend to work on average five hours more each week than non-manual workers, so these hours of work are not directly comparable to the total workforce.

2. On some shifts the worker's physiological and physical performance capacity may be reduced by as much as 50%, thus requiring a correspondingly higher effort in order to maintain the day-time level of productivity.

3. The "cost" - especially in terms of physical fatigue from a given job - will be greater if the work is performed at night.

4. Because the majority of bus and train schedules are geared to a nine-to-five "day", commuting to and from work is more difficult for those without access to a car or bicycle. The length of time spent in travel may prolong a worker's absence from home.

The social aspects of where a worker sleeps is an important determinant of sleep quality. The occupational physician needs to take a good sleep history from any current or prospective shift worker. Irrespective of the degree of "tiredness" at the end of a shift, adequate rest and recovery can overcome fatigue. Nearly all workers report some reduction in total sleep duration while working night shifts. The average reduction in the length of sleep is approximately one hour for each sleep period undertaken after work during the "day". This finding is common to most studies of shift work. (It is interesting to note that sleep length is greatest on the late afternoon shift, which is the least popular because it interferes so much with social patterns.)

Feelings of listlessness, lack of alertness, and general awfulness after sleep may be due to the lowered adrenal hormone levels that occur when customary sleep time is reversed for night-shift workers, even though workers may have had a long period of sleep. "Sleep inertia" - a feeling of malaise and objectively measurable impaired function - can occur after napping (sleeps that are more than 30 minutes and less than two hours). The reason for this is that the awakening often occurs while the waker is still in deep slow-wave sleep, and the brain takes some time to recover normal function.

In night-shift workers who have "day" sleeps, these feelings are due to the interference of the circadian rhythm with sleep structure. Deliberate early rising to start work, or late arousal time after work, explains this phenomenon in workers on "early" and "late" shifts, rather than allergy to the sleep state.

The effect of shift work on sleep *quality* is less clear. A study carried out by Moon indicates significant changes in the structure and quality of sleep. Other studies propound that the changes in sleep quality are extremely variable: many feel that these changes are not significant, and that sleep recovery may be adequate. An important feature of sleep in shift workers is taking "naps" during rostered days off. There is evidence of a short term accumulation of a "sleep deficit" during the working week, which is nearly always recovered during the period off work.

When finding out about a worker's fatigue, the occupational physician should take a good history of hobbies, domestic and recreational activities, and most especially secondary jobs. Secondary work is most commonly undertaken by workers on permanent nights, or continuous or slowly rotating shift systems. A

worker may be more fatigued by the effort demanded by the secondary job or personal interests than by the shift-work job itself.

Social Effects

The shift worker loses a great deal of family contact, and cannot participate in many of the family outings that usually take place during the day. Once the children start school, the conditions for sleep improve, but the child-parent contact decreases still further. Similarly, contact with the spouse deteriorates: there is less opportunity for shared activities during the evenings, and fewer opportunities for spontaneous sexual contact because they go to bed to at different times. This is exacerbated if one partner undertakes permanent night work. This means that both partners can work and both can provide continuous supervision of very young children: the day worker will sleep in the house at night and supervise, and the night worker is around the house during the day. This places enormous strains on both partners and on the marriage. Marital conflict, separation, and divorce are demonstrably higher in shift workers.

Patterns of socialisation

Patterns of socialisation with friends may be quite different after starting shift work. Many shift workers have friends and colleagues on different shifts, or "day only" work systems. This makes it very difficult to meet social commitments and to participate in activities requiring regular attendance - sports games and practices, hobbies such as bridge, or even church or political and educational meetings. Taking up shift work often means giving up important social habits. For a young person, where peer groups and contacts with the opposite sex are an important part of personal development, working shifts may have long-term consequences. Shift workers are less disrupted if they have hobbies that are solitary, such as fishing and tramping (recreation periods wherein daylight may be a positive feature), as opposed to gregarious ù people-oriented social activities or team sports.

Socialisation, alcohol, drugs, and diet

If there is no opportunity to drink with others after work, either because everyone else is at work or asleep or because the pubs are shut, the shift worker may either drink alone at home or drink before coming to work. In addition, alcohol may be used to aid relaxation and promote sleep by a worker having difficulty with sleeping. The combination of these with an increased ability to pay for liquor may lead to abnormal and unhealthy drinking patterns, and possibly alcohol dependence.

The patterns of drug use are less clear, since they are not as structured as those for alcohol consumption. Misuse of hypnotics is fairly common, and other recreational drugs may be used for their relaxing and sleep-inducing properties. In the USA, shift workers may use stimulants and euphoriants such as cocaine to overcome the subjective fatigue commonly experienced when coming "on shift".

There seem to be differences in diet, caffeine consumption, and cigarette smoking among shift workers, too. Day workers traditionally have their lunch breaks communally, either in rest areas or in the work canteens. In many industries where the number of night-shift workers is much lower than that of day shifts, the workers' canteen is not open. Both the type of food and conditions of consumption while on night shifts are often unsatisfactory.

The use of caffeine is increased among shift workers, probably as a stimulant to promote alertness and ward off drowsiness. Excessive use of caffeine may cause indigestion, and subsequent difficulties in sleeping at the end of the shift. Tobacco consumption is also increased among shift workers. Again, they may use tobacco as a stimulant or to relieve stress. How important this increased cigarette use is in the aetiology of ischaemic heart disease and increasing dyspeptic symptoms among shift workers is discussed in a later section.

Other trends among shift workers

Shift workers play less sport and watch more TV than day workers. Many report problems in not being able to follow serialised programmes, or high-quality peak viewing television, unless they use video tapes. Shift workers indicate general dissatisfaction with their health in particular and with life generally, reporting that they have had colds, headaches, and allergic symptoms, and that they frequently feel tired and exhausted. Not surprisingly, shift workers go to their general practitioners more frequently than day workers do, mainly for minor illnesses. Perceptions about health seem to be related to job satisfaction in both day and shift workers: notably, those with the greatest dissatisfaction have the lowest self-scored health ratings. There was no evidence to indicate that shift workers found their jobs any more satisfying than day workers, although they did find the mental demands greater. Shift workers report more problems with marriages than day workers. They complain about too little contact with spouses, about their spouses being lonely, and about having general personal problems.

Circadian Rhythm Disruption (dysrhythmia)

Irregular activity and work have three independent effects
1. "Time since sleep" effect
2. Time of "Day"
3. Time of task.

From a circadian point of view, any work/rest schedule that requires a person to be awake when they would normally be asleep can be considered shiftwork. An altered work-rest schedule reset the clock to some extent. However, it is at odds with the time cues coming from the unchanged daylight cycle and the diurnal orientation of most of society, which tend to push the clock back towards its preferred 24-how routine with sleep at night. Because of the conflicting time

cues, the clock of the shiftworker can never become fully adapted to any given work/rest schedule. In addition, most shiftworkers revert to being day-active on their days off.

Circadian rhythm and worker performance

Human performance efficiency varies over the day. Like physiological rhythm, performance fluctuates gradually over a 24-hour period, deviating from the usual level by 10% or more either way. For many tasks, performance parallels the circadian rhythm for temperature. The graph for memory tasks - short-term recall of new information - shows a very different function related to the time of day, peaking at "night". In some situations, adjustment in the phase of the performance rhythm can both improve or worsen night shift performance.

Many tasks which carry a low memory load are performed best during the day and worst during the night. Good performance can either occur through a normally night-peaking rhythm showing comparatively little adjustment, or by a normally day-peaking rhythm showing considerable adjustment. Conversely, poor performance can occur because one has a normally day-peaking rhythm showing little adjustment or by a night-peaking rhythm showing a comparatively large phase adjustment.

In principle, performance on night shifts will depend on certain functions:

1. The nature and demands of the task.
2. The pace of work and the number of breaks.
3. The length and rotation of shift systems, as they relate to circadian rhythm adjustment and fatigue.
4. Individual differences among workers, i.e. personality, motivation, commitment, "morningness", and social support.

Performance is best on the 16:00-23:00 shift for many repetitive, low-memory-load tasks, and worst on the 23:00-08:00 shift. Studies comparing accident rates between shift and day workers, however, have been largely unsatisfactory, since conditions at night are very different from those during the day, and it is difficult to control for the many variables. Several studies suggest that accidents are less frequent at night, but that those that occur tend to be of greater severity.

Health and Shift Work

Workers are aware that shift work costs them: it may lead to their feeling unhealthy and tired, or to a greater number of minor illnesses. Sickness absence are lower, but absences are of longer duration than those of day workers. This contrasts with the higher frequency of general practice consultations for minor illnesses, and the more frequent reporting of colds, hay fever, and headaches seen in shift workers.

Gastrointestinal symptoms are very common among all shift workers. Doll and Avery Jones found no increase in the prevalence of frank peptic ulcers in shift

workers, but found that any shift worker who had already been diagnosed as having a peptic ulcer was two to three times more likely to experience symptoms. There was no evidence that shift work actually caused ulcers, although the majority of shift workers complained of minor gastrointestinal upsets. This is attributable at least in part to irregular meals, altered diet, and increased alcohol, tobacco, and caffeine consumption, but may also indicate an effect of meals being taken at times other than those normally expected in a daytime circadian rhythm.

Cholesterol and lipids both tend to be higher in shift workers. There is still a major controversy about the risk of ischaemic heart disease. A well constructed review did not find any significant increase in cardiovascular mortality and a number of studies are difficult to interpret.

There appears to be no greater prevalence of frank mental illness among shift workers. Shift work is now recognised as a potential source of occupational stress, however, particularly when it involves night work. This stress arises in part from the requirement to stay awake when the individual worker (and others) would normally expect to be asleep, but the social changes imposed by shift work may also be contributing factors.

The SMR (Standardised Mortality Ratio) for neoplasms seems to be higher in shift workers, and chronic bronchitis is higher than in day workers. The combination of stress, altered diet, and higher lipids has led some researchers to postulate that shift work may increase the risk of developing ischaemic heart disease. The SMR of shift workers is actually lower than 100, but this may reflect the "healthy worker effect" due to screening, and the "survivor effect" of those who adapt well to shift work. A definite premature medical retirement rate is evident among older workers in particular, but it is important to look at ex-shift workers as well. When the confounding effect of smoking is accounted for, there is no excess of ischaemic heart disease attributable to shift work.

Designing the Ideal Shift System

One interesting study tried to apply circadian principles to the work schedules of rotating shiftworker in a round-the-clock potash harvesting operation. The rotational schedule was changed from a pattern where people begun work successively earlier with each (1-hour) shift change, to a pattern where they begun work successively later with each shift change. In addition, the length of time that workers remained on tiny given shift was increased from one week to three weeks. The result was a 20% increase in productivity, major improvements in the job and schedule satisfaction of workers, and in their assessment of their own health, and a reduction in personnel turnover.

Incomplete adaptation of the clock to changing work schedules will degrade on-the-job performance in two ways. First people may be working through each

part of the circadian cycle when their performance capacity is lowest around the time of the temperature minimum).

Second, their sleep is displaced from the preferred part of the circadian cycle. Complaints of sleep problems we three times more common among shiftworkers (reported by 61%) than among day workers. Reducing the duration and quality of sleep increases wake-time sleepiness and impair performance. Working through the circadian low-point with a sleep debt is double-loading the vulnerability for error. There are some dramatic examples of the consequences. From 4-6 am on March 28, 1979, shiftworkers failed to recognise the loss of core coolant water resulting from a stuck valve in the unit two reactor at the Three Mile Island nuclear power plant. As a result of the mechanical failure, compounded by the human failure to detect that the reactor came close to a melt down later that morning. The catastrophe at Chernobyl began at 0123 was also the result of human error..

Most occupational physicians are agreed that the worst possible type of shift is the weekly rotating shift, and yet this is the commonest type of shift system in current use (63% of all shift systems in Australasia). Permanent nights is rarely used except for special occupational groups, like night watchmen, newspaper workers, and night sisters, and, as we have seen, the result is a circadian rhythm that is anything but permanent nights! The most suitable shift system from a psychophysiological perspective is the rapidly rotating shift, where the effects on endogenous circadian rhythms are minimal. There is little to choose between the Continental and Metropolitan systems. From a social point of view, however, many workers do not like the rapidly rotating shift system, because it makes it almost impossible to plan future social commitments and know what shift they will be working on any particular day. This often makes it difficult for the occupational physician to make his case heard.

Other parameters of a shift system are very important, such as the length of shift and rest periods, direction of rotation, and the starting time of the shift. Eight hours is the commonest length of shift, but 6-hour and 12-hour shifts are not uncommon in certain industries. All of us have worked 24-hour shifts and longer as hospital residents. A shift system is less flexible than many non-shift industries. There is less facility for overtime, coming in early, or working late, as the workstation and other equipment may well be already in use by workers on the other shifts. As there is less freedom of choice, it is important that the duration of the work period is acceptable to all workers involved. Again, while an 8-hour shift may seem to be the most suitable, many workers prefer to work 12-hour shifts with extended rest periods. Working three or four 12-hour shifts may be followed by a three-day long "weekend", which suits many workers with outside interests. There is nothing wrong with 12-hour shifts, as long as the rest periods are also correspondingly lengthened.

The Australian Council of Trade Unions' code on 12-hour shift work makes the following recommendations:

- there should be recognition of the health risks of shift work
- there should be distinction between leisure time and recuperation time
- no more than two night shifts should be worked in succession
- health supervision and services should be provided to shift workers
- 12-hour shifts should be permitted under certain circumstances
- 12-hour shifts should be introduced on a trial basis for 12 months in any workforce
- introduction of 12-hour shifts involving bonus or incentive schemes or similar levers are opposed
- 12-hour shift-work rosters must be developed in consultation with workers through their unions

Lees and Cunningham both found that 12-hour shifts were actually less stressful than 8-hour periods, and the maximum acceptable shift duration and the minimum rest period also depends on the intensity of the work: arduous, paced physical labour is more rapidly and severely fatiguing than monitoring. With any length of shift period, the principal hazard is too short a rest between shifts, which is a particular risk on rapidly rotating shifts.

Ensuring good first aid and treatment facilities 24 hours a day

It is certainly a desirable ideal to provide a round-the-clock occupational health service. Certainly the occupational health staff should visit the workplace at night from time to time, so that the same opportunities are available to night-shift staff as to day workers. Because the consequences of industrial accidents or toxic exposures may be very severe, careful attention should be paid to workplace hazards. It is important that first-aid facilities, eye baths, etc. are clearly lit and readily accessible (and not locked away behind closed doors at five o'clock!). Routes of access to evacuate injured staff in the event of industrial accidents or major disasters must be clearly defined, even when parts of the factory are closed at night. It is just as important that trained first-aiders are retained on duty during the night shift as it is by day, more so in fact, because access to medical care is not as good.

Workers on medication

- the toxicity and desired effects of prescribed drugs will vary owing to the diurnal variations in absorption, distribution, and pharmacological effect: some drugs may also affect the circadian rhythm of workers or their alertness
- it is very important that drugs are not prescribed to be taken at night or in the morning, but at bedtime or on getting up: this is particularly true for antidepressants, antihistamines, anti-hypertensives, diuretics, and hypnotics (Lentizol may cause miosis, making night driving in conditions of glare and impaired vision very dangerous)
- workers commonly make their own adjustments for the alterations in chronopharmacology by omitting the "Sunday dose" (by not taking a once-a-

day drug on their rostered day off): this seems to balance out the often increased biological effect of many long-acting drugs

- any worker on medication must be told clearly that he must advise the occupational health nurse if the medication is changed in any way

Ensuring optimum working conditions

It is vital to ensure that lighting, heating, and ventilation are adequate during the night shift. Because air temperatures tend to drop at night, and vents, windows, etc. are often closed for security reasons, fumes may build up and air circulation may be poor. Lighting must always be adequate and appropriate to the task in hand.

Because there are fewer personnel around at night, it is essential that there are checks in place to ensure that no-one can become trapped in confined spaces or on heights without being able to attract the attention of other workers. This is particularly important in freezers, or where fumes may overcome a worker while he is inside a confined space. A system of alarms or checks through a "buddy system" may be necessary.

It is important that workers have the same access to rest and recreational facilities during breaks as day workers. Transport facilities to and from work at the beginning and end of the night shift should be as good as possible, since it may not be enough to rely on public transport.