Chapter Two

Shift Work Vis-a-Vis Shift Workers

2.1. Overview of Reported Research Findings

Shift work schedule is encouraged mainly on the overall ground of economy - regarding capital investment, manpower utilisation, and proper use of the machineries, of an industrial establishment. Side by side, human-factor researchers have identified and reported several grave aspects of adjustment problems of the shift-workers with reference to physiological, psychological, and social-life variables and along the dimension of fitness-unfitness, mainly (Mott et al, 1965; Maurice, 1975; Agervold, 1976; Carpentier and Gazamian, 1977; Dunham, 1977; Tasto, 1978; Koller et al, 1978; Gordon et al, 1981; Jamal, 1981; Froberg, 1981; Kumashiro et al, 1982; Smith et al, 1982). A critical scrutiny of above research findings help in drawing an inference that majority of the shift workers' health problems spring from lack of adjustment between the workers' habitual physiological, rhythms and social life and the rhythms imposed by their shift work schedule. Survey of research literature regarding the shift workers' problems have helped the present investigator to identify the following important areas of disturbance, the impact of which causes impairment of health and efficiency of the shift workers.

2.2. Sleep has been recognised as the most important parameter by a good number of researchers in affecting shift workers' health and efficiency (Wyatt and Marriott, 1953; Thiiis-Svensen, 1958, 1969; and Kleitman, 1963).
It is reported that the unusual duty hours disrupt the workers' normal sleep habit, during rest pause or break they may encourage drowsiness but can't sleep due to uncongenial environment, and that day time sleep of the night shift workers can never be considered as an adequate and appropriate substitute. Recent research reports have clearly pointed out the role of individual constitution of the night shift worker in becoming the victim of the said bad effect by setting aside the assumption of an equal amount of any generalised bad effect (Spencer, 1970; Rutenfranz et al, 1981).

Tepas (1982) has observed that shift workers find problems in sleeping deeply during day time after night shift work. The rotating shift workers have been observed to report of significant 'disturbed sleep' state under environmental disturbances in residence (Smith et al, 1982). Khaleque and Rahman (1982) have reported similar complain being associated with other health problems of 116 permanent shift workers and 44 shift workers undergoing weekly changes from morning to afternoon to night shift placements. The comparison between the incidents of health problems of fixed-shift and rotating-shift workers have revealed more events of sickness in the latter group.

Sleep disturbance and its concomitant bad effect has been observed more distinctly in aged and experienced shift workers (Andlauer and Fourre, 1965; Bannel and Dervillee, 1971, Chazalette, 1973; Faret and Benoit, 1979) and in the shift workers above 45 years as the cumulative effect (Akerstedt, 1980); while Meulenbergs and Verhaegen (1982) have observed shift workers of above 50 years well-adapted to their respective shift work schedule.
Koller et al (1978) have observed high noise-sensitivity, to cause disturbance, amongst the drop-outs in a shift workers group in a schedule of three continuous rotating shift of an oil company - "the drop-outs regarded the environment more noisy causing their sleep disturbance often" in comparison to non-dropouts. In an intervention study, by making the night-shift discontinued, Akerstedt and Tarsvall (1977) observed diminution of sleep disturbances and increment of total hours of deep sleep amongst a group of Swedish three-shift worker. In a different study they observed that by replacing workers from three-shift and four-shift schedules to two-shift schedule they exhibit an overall improvement of health reports than their old shiftmates.

2.3. Gastrointestinal disturbances are also recognised as a common health problem of the shift workers (Hogg, 1961; Leonard, 1979) with special reference to anorexia and dyspepsia (Mott et al, 1965; Rutenfranz, Knauth, and Angerbach, 1981), changes in eating habit (Takagi, 1972), and malnutrition (Debry and Blayer, 1972) due to violation of daily rhythm in fulfilling major biogenic body-needs (Mann and Hoffman, 1960; Mather et al, 1970) and excessive use of gastrointestinal-tract stimulants like caffeine, tobacco, and alcohol (Metz, 1960). Side-effects of autointoxication due to disturbed rhythm in the elimination of metabolic waste products from system has also been reported (Paleky, 1943; Mott et al, 1965).

In spite of several supportive reports the researchers in this field have failed to produce unequivocality about health impairment effect due to shift work (Colligan, 1981) due to the presence of a significant quantum of individual variations indicating 'least impairment and even no-impairment'.

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A research report suggests that significantly greater proportion of the shift workers affirmed the need for change in the form of rotation from morning, to afternoon, then night shift, sequentially (Koller, Kundi, and Cervinka, 1973).

2.4. Psychological disturbances of the shift workers have been studied by a number of researchers with reference to the expressed feelings towards job and other spheres of life, noise, mental balance, temperament, and cognitive functions of the workers concerned.

Mott, Mann, McLoughlin, and Warwick (1965) have observed insignificant effect in the areas of self-esteem, anxiety, and conflict-pressure of the shift-workers, while the Sri Ram Centre researchers group (1970) reported noticeable development of conflict-pressure amongst the rotating shift-workers and Wyatt and Marriott (1953) noted severe and widespread feelings of exhaustion among night-shift workers — corroborative statements have recently been made by Smith, Colligan, and Tasto (1982) also. Carpentier and Cazamian (1977) are of opinion that the over-fatigue and the specific ill-health symptoms of the night shift workers result from nocturnal de-activation strain and insufficiency of restorative sleep during diurnal activation; and ageing aggravates both strain and insufficiency factors. Zedeck, Jackson, and Summers (1983) have observed significant declining of sense of well-being of rotating-shift workers — more in the afternoon shift and most in the night-shift. Effect of maladjustment has also been reported by Jamal (1981) on the basis of his study with nurses and factory workers following continuous shift work schedule. Boredom, loneliness, irritation, anxiety, and depression are found
as the major psychological problems of the shift workers doing with machine operation in a medium-size industrial organisation (Kumashiro et al., 1982).

2.5. **Disatisfied attitude** of the shift workers have been reported by several researchers like Best (1960), Mann and Hoffman (1960), Naville et al. (1961), Shri Ram Research Group (1970). In this connection Wedderburn (1981) has observed that "relatively positive attitudes toward shift work were expressed by men on rapidly rotating systems". Corroboration evidences are available in the comments of other researchers also (Blakelock, 1960 and 1967; Spencer, 1970). Except the financial incentives there lies no other attraction in the rotating shift work. Hesitation to continue shift work rather a wish to abandon it develop due to ageing, health breakdown, irregular way of living family and social life (Maurice and Monteal, 1975; Khaleque and Rahman, 1982; Zodeck, Jackson, and Summers, 1983). Employees being transferred from a four-shift schedule to three-shift schedule are reported to express significant negative attitude (Akerstedt and Torsvall, 1978; Nachreiner, 1980). With regard to preference for shift change, 91% of the day workers stated a preference for the day shift while none of the rotators preferred participation in rotation schedule (Gordon et al., 1981).

2.6. **Satisfaction with shift work schedule** has been found dependent on wage-satisfaction and promotion opportunity of the employees (Best, 1960) and with lack of physical discomfort and social-life grievances in the self-choiced shift work schedule (De La Mare and Shimmie, 1964; Walker, 1966). Satisfaction with the assignment in the shift work schedule bear a high positive relation with shift-workers overall satisfying attitude to that extent when
they express a desire to stick to the preferred shift work schedule (Shri Ram Centre, 1970). Married workers who are satisfied with shift work assignment have expressed their satisfaction even with three-shift schedule placement (Monteil, 1965) but the said level of satisfaction may not persist along with skill development in some of them (Maurice, 1975). In general older shift workers show higher satisfaction with shift work schedule (Mott et al, 1965). As the worker's level of difficulty in performing duly social role increases, the self-esteem declines, so his anxiety and conflict-pressure increases and which ultimately affects his level of satisfaction with his work schedule, irrespective of any typical personality disposition (Mott et al, 1965). The 'adaptation index' for the shift workers prepared by Tasto (1978) showed that the best adapted workers were 'not too neurotic', satisfied with assignment in the shift work, and had preference for the shift work schedule.

2.7. Family-life and social-life disharmony has been considered as one of the common consequences in the life of shift workers - more in a semi-continuous three-shift system and most in continuous three-shift system (Maurice and Monteil, 1965). Shift workers often complain of reduced opportunities for contact with their children (Ulich, 1957; Carpentier and Gazamian, 1977). Wives of the shift workers have reported of their domestic life problems in order to keep their respective husbands weekly changing work-schedule (Knauth et al, 1975). The effects of shift work seem to influence two aspects of family life, viz., (i) the practical organisation of day-to-day domestic life, and (ii) in the overall family life climate (Fourre, 1962), e.g., an unhealthy family climate due to defective role-performance of either or both parents.
under employment in a continuous rotating shift schedule (Shri Ram Centre, 1970). Married shift workers without child prefer shift work more than workers with child within 5 years (Wedderburn, 1981), subject to exception cases also. Inter-individual differences regarding equivocality of both advantages-and-disadvantages of shift work are also not uncommon (Chazalette, 1973).

Shift workers voice complaints, from their ends, relatively more often about disturbances in the wider social sphere in community life than in family life (Naechreiner and Rutenfranz, 1975) and in performing certain necessary household upkeepment work (Maurice, 1975). Wedderburn (1981) collected data from a steel industry shift workers population favouring the above view on 61% level. Shift workers' problems in failing to meet social obligations with family, friends, colleagues, and relatives along with consequent dissatisfactions have highlighted by a number of researchers (Blakelock, 1960; Mann and Hoffman, 1960; Maurice and Monteil, 1965; Mott et al, 1965), more emphatically for continuous three-shift system.

Working in shifts prevent workers in enjoying recreational programme and deprive them in participating higher educational courses meant for professional enrichment (Rutenfranz et al, 1977) and the consequent problems of shift workers are more likely to occur in communities with small concentration of shift workers for want of special facilities for them only (Dunham, 1977). Besides, there is one general complain that because of regular participation in continuous three-shift schedule the workers' scope for taking active part
in voluntary social organisation, for social work, for community service, and for political moves becomes highly limited (Bast, 1960; Blakelock, 1960; Mott, Mann, McLoughlin, and Warwick, 1965; Wedderburn, 1967; Khaleque, 1984).

2.8. Production and industrial efficiency become affected under the impact of physiological, psychological, and social-life problems of the shift workers. Pending consensus (Malaviya and Ganesh, 1976), majority of researchers agree that the level of performance on the night-shift work is by far the lowest (Vernon, 1943; Wyatt and Marriott, 1953; Bjerner and Swensen, 1953; Brown, 1955; Ulich, 1957), and for the said detrimental effect on output those who do not prefer shift work schedule may be made more responsible (Shri Ram Centre, 1970). In spite of a confusing and inconclusive information in the productivity literature up to 1959, a research survey report has agreed in favour of output decrement trends in the night-shift work (Mann and Hoffman, 1960).

In spite of any lack of unanimity about more human factor accidents during night shift work (Bostrand, 1978; Rutenfranz, 1977), a careful survey with 11,000 workers in the mining and steel industries, following three-shift system, revealed that "more frequent but less serious accidents take place during morning and afternoon shifts, while more serious but less frequent during night shift (Andlauer and Metz, 1967)."

**Absence rates** of shift workers have been found higher in the studies conducted by Brusgaard (1949), Maurice (1975), Jamal (1981) and Smith et al (1982) while contradictory remarks are reported by other researchers (Thiss-Svensen, 1958; Aanonsen, 1959). "Night work impaired fitness or inclination for work, which resulted in a higher rate of absence in the later weeks of..."
night shift and in the earlier weeks of the following day shift. Similarly, for the high rates of absence on the day shift they mentioned of counter-attractions outside the factory and higher rates of payment for night work (Wyatt and Marriott, 1953). Findings in this regard are highly inconsistent and often contradictory (Mott et al., 1965). "The studies carried out so far have by no means produced final conclusions with regard to the effect of shift work on output, accidents, or absenteeism" (Maurice, 1975). In a study conducted by Japan Association of industrial Health (1979) the frequency of absence from work was assigned mainly on the sickness of the shift workers, irrespective of number of shifts. Similar observations are made by Forberg (1981).

2.9. The question of Frequency of shift-rotation so far dealt with by different investigators disclosed the workers' preference on an optimum schedule for rotating shifts — but what should be the preferred frequency of shift rotation? According to Maurice (1975), the question is still highly controversial and, at the moment, opinion remains divided on this issue, though majority has expressed a direct or indirect support on "rapid rotation" (Rutenfranz et al., 1977; Rutenfranz et al., 1981) strong advocates of "slow shift rotation" are also observed in good numbers (Winget et al., 1978; Shri Ram Centre, 1970; Wyatt and Marriott, 1953). Barhad and Pafnote (1970) have failed to find any difference between these two types, viz., fast and slow rotation shift systems.

2.10. On the Quality of Working Life or QWL though there are a few empirical studies in record with local workers, viz., QWL vs Job attitude (Joseph, 1978), important correlates of QWL of the managers in public and private sectors
(Ghosh and Kalra, 1982), management style vs QWL perceived by the managers (Singh and Maggu, 1980), performance and job satisfaction vs QWL of class III employees (Sayeed and Sinha, 1981) but the scope remains yet open to do with shift worker population specifically.

Major findings, so far published, relevant to the welfare of the shift workers have highlighted that the core of their maladjustment and coping difficulties rest on the complex psychosocial press in relation to personality disposition of the individual shift worker mainly, which includes his/her perceptual world and, thereby, the 'quality of working life'. Accordingly, a detailed discussion on the said 'psychosocial aspect of the shift workers' problems along with 'supportive published literature' has been incorporated in the following pages under Chapter three.