

CIRCADIAN® Report

Shiftwork Lifestyle Training
Employee and Employer Benefits



CIRCADIAN®

24/7 WORKFORCE SOLUTIONS

SHIFTWORK LIFESTYLE TRAINING: A critical component of any FRMS

A path from employee good health and well-being to employer fiscal competitiveness and productivity.

INTRODUCTION

While everyone is vulnerable to the health and safety risks of on-the-job fatigue, shift workers face significantly greater health, safety, and social challenges as a result of fatigue, than their day-working counterparts. If workplace fatigue is not adequately controlled and managed, shift workers experience more human errors and accidents, chronic health conditions, family and social challenges, increased absenteeism and turnover, and lower productivity than people who work traditional daytime hours.

Awake/sleep schedules for employees who consistently work in the evening, at night or on the weekend, that are out of step with their families present unique challenges. Shift workers also have a significantly higher risk of workplace accidents and injuries when compared to daytime workers. In addition, if not properly managed, a shift worker's health can also be adversely affected. Chronic diseases, such as metabolic syndrome, gastrointestinal disorders, cardiovascular diseases and some types of cancer are more prevalent in the shift worker population (Neil-Sztramko et al., 2014). This is due to exposure to circadian disrupting light at night and also in the past due to the higher incidence of unhealthy lifestyle behaviors, such as a poor diet, physical inactivity, tobacco use, hypertension, and being overweight/obese in this group (World Health Organization, 2012).

These health, safety, and social challenges not only directly affect the shift worker, but the employer also incurs extra costs as a result of increased absenteeism, turnover, medical care, safety incidents and production errors. For example, risk factors associated with shiftwork such as obesity, and high stress levels are significantly related to increased health care costs and illness related absenteeism (Aldana, 2001).

The good news is that these challenges can be effectively managed. The gold standard for addressing the challenges of workplace fatigue is a Fatigue Risk Management System (FRMS), a scientifically based system with multiple components, driven, implemented and improved by data and involving the participation of management, employees and union representatives (when possible). An important component of any FRMS is the inclusion of an education, training and awareness program that addresses all aspects of the shiftwork lifestyle and behavior that impact fatigue, in addition to environmental factors (e.g. light, noise) (Wong et al., 2019). Optimally the fatigue training is holistic in approach and in addition to fatigue-related issues such as why sleep is important, guidelines for how much sleep is needed for optimal health, and how to get better sleep, topics such as nutrition while working the night shift, maintaining health when a shift worker and how shiftwork affects family life are also addressed (Circadian, Managing a Shiftwork Lifestyle).



The techniques that an employer or an employee can use to help mitigate the social, health and safety risks associated with shiftwork are not always obvious, and unlike other skills, cannot be simply “picked up on the job.”

Workplace fiscal competitiveness and productivity is heavily reliant on workers' good health and well-being.

(World Economic Forum 2008)

Generally, workplace health promotion interventions have been found to provide positive financial returns, mainly by lowering health care costs and absenteeism rates. Worksites not only provide a natural social context for such trainings, but also have the potential to reach a large number of people, including individuals who otherwise may not be motivated to engage in healthy lifestyle activities (Lassen et al., 2011, Guazzi et al., 2014). Several studies have found that the convenience of the workplace setting for group-based lifestyle interventions focused for the shift worker population facilitated participation in the programs (e.g. weight loss, physical activity) (Demou et al., 2018, Smith et al., 2016, Lassen et al., 2017).

This white paper examines the key elements of a successful lifestyle training program designed to manage the health, social and safety challenges of shiftworkers, and the benefits derived by both employees and employers when a specialized training program is implemented.

HOW WIDESPREAD IS SHIFTWORK LIFESTYLE TRAINING?

Multiple surveys show that lifestyle training focusing on the challenges associated with the shift worker population is not yet widespread. The US federal government periodically sponsors surveys to assess the extent to which employers offer workplace health promotion programs, policies, and practices. In fact, the 2017 Workplace Health in America Survey, a nationally representative survey of employers sponsored by the US Centers for Disease Control and Prevention (CDC), showed that almost half of the worksites surveyed (46.1%) offered some type of health promotion or wellness program though the survey did not differentiate between programs offered to day workers and shift workers (Linnan et al., 2019).

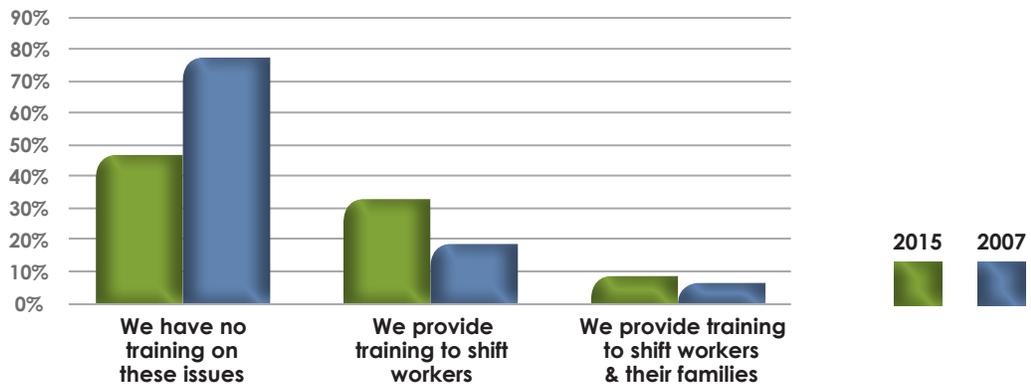
In the Workplace Health in America Survey, the CDC found that the proportion of comparable worksites with comprehensive programs (as defined in Healthy People 2010) rose from 6.9% in 2004 to 17.1% in 2017. Nationally, almost 30% of worksites offered some type of program to address physical activity, fitness, or sedentary behavior and 19% of worksites offered a program to help employees stop using tobacco products. Weight management programs were offered by about 17% of worksites.

It is noted by the CDC study authors that although the percentage of worksites offering programs is increasing, employee participation remains relatively low in most health programs. The study suggests that creating interventions that meet the real needs of their intended audiences is a strategy that could increase employee participation.

CIRCADIAN has conducted a Shiftwork Practices survey of 24/7 workplaces for over two decades, evaluating the health, safety and training of shift workers. CIRCADIAN's results agree with the findings of the CDC Shiftwork Practices Survey 2017 (224 North American companies working 24/7) found that shiftwork operations providing shiftwork lifestyle training for their shift workers has increased from 22% in 2007 to 40% in 2017 (CIRCADIAN 2017).

Facilities that offer shiftwork lifestyle training report lower turnover levels, better morale, and less severe fatigue problems than facilities that do not offer training (CIRCADIAN 2017).

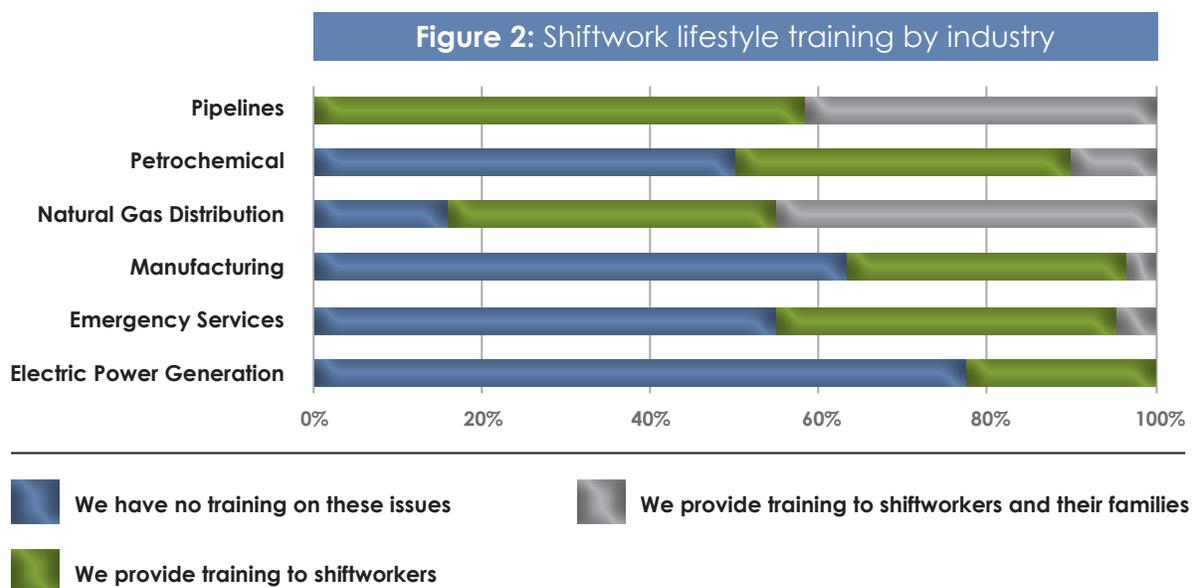
Figure 1: Shiftwork lifestyle training in 24/7 operations





As shown in Figure 1, not all workplaces offer the same type of training. It is noteworthy that only 8% of shift work facilities involve the families of the shift worker in the lifestyle training. Involving families is an effective tool, as it provides family members with a better understanding of shift worker challenges related to their schedule, provides practical ideas to support the shift worker's need for sleep, proper nutrition, and suggests how best to organize household chores and family activities in a manner that does not sabotage the shift workers efforts to obtain adequate good quality rest. Shiftwork affects the entire family, not just the shift worker, therefore involving the family not only helps to provide support and reinforcement in the home, but also maximizes the training's long-term value.

CIRCADIAN Shiftwork Practices Survey 2017 evaluated which industries are more likely to provide shiftwork lifestyle training to their employees (Figure 2) and found that Pipelines, and Natural Gas Distribution are most likely to offer specialized training focusing on the shiftwork lifestyle, both to shift workers and to their families. Data from the survey demonstrates that these industries also have some of the lowest absenteeism and turnover rates, and fatigue-related safety concerns (CIRCADIAN, 2017).



ELEMENTS OF A SUCCESSFUL SHIFTWORK TRAINING PROGRAM

Attracting as many employees as possible, as well as reducing the number of program dropouts is key for the success of any lifestyle training program. Moreover, it is fundamental that the program reaches individuals at the highest risk. Several studies have shown that employees who have high-risk behaviors, such as smoking, sedentary lifestyles, hypertension, and high cholesterol levels, are less likely to participate. Those who do participate are more likely to be younger, well-educated, female, non-smokers and white-collar workers.

There are several essential elements to maximize a training program's success (Harden, 1999).

- 1. Ensure Management Support:** Productive engagement, visible support and involvement from management to reduce fatigue risk in the workplace is critical to any program success.
- 2. Identify Target Audience:** Focus on well-defined and modifiable risk factors, which constitute a priority for the specific employee group/target audience.
- 3. Conduct a Needs Assessment:** Identify the needs of the target audience and develop holistic interventions that are customized to the characteristics and needs of the target group and organization and its culture.
- 4. Set Program Goals:** Evaluate the employees' motivation and readiness to change. This assists in determining the information to provide and how to most effectively help employees reach their goals.
- 5. Deliver Practical Information & Skill Development Opportunities:** Customize the training to provide scientifically based information relevant to the unique challenges of shift workers. If employees do not perceive the interventions as relevant and practical, the participation rate will be low, and the efficiency of the program will be substantially reduced. For instance, in the case of shift workers rather than simply delivering general information about good sleep hygiene practices, demonstrating the link between sleep loss and a typical work schedules and the role of sleep loss in health and effective performance is more relevant.
- 6. Foster Ownership:** Involve employees, management, union representatives (if applicable) and any other interested parties in the planning and implementation of the lifestyle training program. Being involved in the planning phase of a program empowers employees to take responsibility for their own 'fitness for duty'.
- 7. Attendance:** Require attendance by employees and management to convey the importance of the topic.

Employee perception about corporate support of lifestyle training will affect the success of a program (Morris et al., 1999). A study in a manufacturing company found that even though blue-collar workers have greater health risks in terms of blood pressure, weight, and smoking habits than white-collar workers (management, engineers, and clerical workers) they are less likely to participate in health promotion programs. The study also shows that blue-collar and white-collar employees view the workplace health climate differently. The biggest difference in perception is in supervisor support. White-collar employees feel more support from their supervisors and report a stronger employer

health orientation. It is unclear whether these differences are due to varying levels of support among groups or to the support not being communicated as effectively to the blue-collar group. These findings have practical relevance, because if blue-collar workers are skeptical about employer commitment to health programs, they will be less likely to participate.

Ensuring that workers perceive the interventions as relevant to them is also a key factor for the success of the program (Sorensen et al., 1996). A study evaluated the impact of combining smoking cessation programs with work safety programs (a program informing workers how to protect themselves from exposure to toxic chemicals and hazards). In the work sites that implemented the combined program, twice as many smokers quit after 18 months, compared to workplaces that had implemented only the smoking cessation program.

TRAINING DELIVERY METHODS

Multiple delivery options for lifestyle training are available, including presentations to groups of employees, (e)mailed information, and posters, newsletters and pamphlets distributed in the workplace. Presentations require the highest time investment from employees and may be costly to employers, but they also have benefits that cannot be achieved otherwise. Group training sessions provide opportunities to share concerns and experiences which helps the program participants understand and apply the information. In addition, considering the impact of extended hours operations on family life, CIRCADIAN strongly recommends involving spouses and sometimes children in the training sessions. Training sessions can be scheduled as part of regular on-the-job training activities or as a special company event at a meeting facility.

A key factor for ensuring the success of all training programs is reinforcement of the information provided. Posters in the workplace, newsletters, pamphlets, company websites, safety meeting topics, and e-mail can be used for this purpose.

A new trend in workplace training involves the use of smartphones, apps and web-based interventions. The advantage of these types of interventions is that they can tailor information and advice to the specific needs of the individual. In a research study, the authors used a mobile phone app to direct airline pilots to websites offering either tailored advice or general advice only (control group). After six months, the intervention group showed improvements in fatigue, sleep quality, physical activity, and snacking behavior. (van Dongelen et al., 2014).

IMPACT OF TRAINING PROGRAMS FOR SHIFT WORKERS

Employee Benefits

It has been demonstrated that fatigue training improves safety and health outcomes in shift workers (Barger et al., 2018). In addition, a series of studies, as well as meta-analyses, evaluating the impact of health promotion and training programs found positive effects with a broader lifestyle approach focusing on dietary habits among plant workers (the POWER study, Morgan et al., 2011 and 2012) and on physical activity among firefighters (the PHLAME study, MacKinnon et al., 2010, Ranby et al., 2011, Kuehl et al., 2013).

The outcomes of these studies include improvement in healthy eating habits, weight, physical activity and work performance. The long-term follow-up of the PHLAME study suggests that the participating worksites continue to improve their outcome measures for several years following the program. In addition, moderate positive effects in physical activity, strength and LDL cholesterol levels were seen in the two smaller 'high-intensity' studies using individually tailored or supervised exercise programs among nurses. This review supported the conclusions from a similar analysis that the most effective interventions may be the ones that are of high intensity or include a specific motivational component besides interventions with multiple lifestyle components (Tam and Yeung 2018). These studies included participatory and empowerment strategies, both key elements to ensure that the program responds to employees' needs.

A systematic review of randomized studies on the impact of worksite interventions to promote healthier food and/or physical activity among shift workers included interventions with a broad lifestyle approach (Lassen et al., 2018). The studies had sample sizes from 30 to 1,000 and had interventions which lasted between 2 and 12 months. In general, the studies show positive effects on several measures, including dietary and/or physical activity measures. A mixture of health promotion strategies using individually tailored programs is recommended.

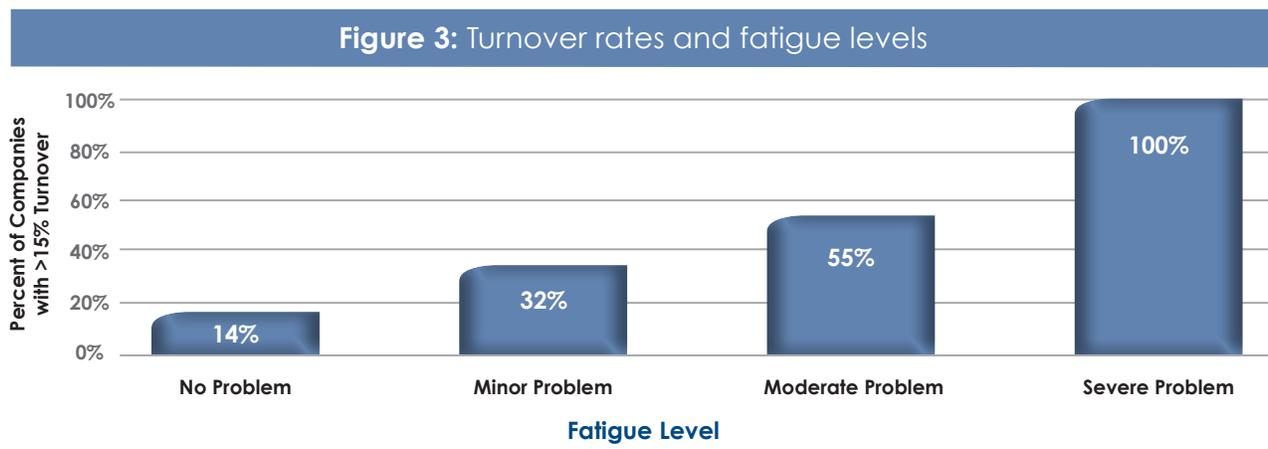
Employer Benefits

CIRCADIAN's Shiftwork Practices 2017 presented data collected from 224 shiftwork operations. It is used to benchmark key performance indicators and identify important trends and best practices that are defining success in the 24/7 economy and highlights the benefits of shiftwork lifestyle training (CIRCADIAN 2017).

Turnover:

The cost of replacing an employee (including any recruiting costs), is substantial (CIRCADIAN 2015). While costs vary significantly by industry, the potential savings by lowering turnover rates as a result of shiftwork training is significant across all industries.

CIRCADIAN's Shiftwork Practices 2017 found that facilities that provided training to shift workers exhibited lower levels of turnover (Figure 3).

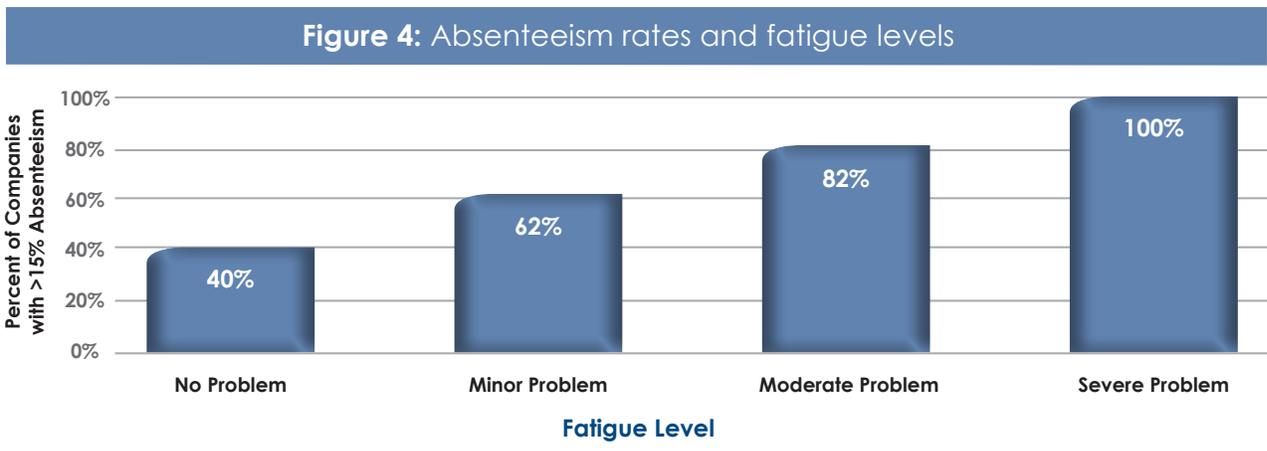




Absenteeism:

Absenteeism is a major problem area for employers.¹ Work-life balance has been gaining relevance, as employees demand more time for family and social activities, and increasingly reject long work hours. The economic pressures of the recent years have compounded the problem, with a reduced workforce struggling to maintain productivity, resulting in long hours and increased stress. A survey of U.S. companies highlighted the relationship between absenteeism and personal issues. According to this survey, only 34% of unscheduled absences were related to personal illness. About two thirds of absences were due to other reasons, including family issues (22%), personal needs (18%), stress (13%), and entitlement mentality (13%).²

The demands of shiftwork on family and social life, combined with its impact on health and sleep, cause absenteeism to be higher in shiftwork than in traditional daytime operations. The Bureau of Labor Statistics (BLS) reported that in 2015 the absenteeism rate for full time and salary employees in U.S. industries was 2.9%.³ It should be noted that BLS data showed that absenteeism due to illness or injury represents about two-thirds of all absenteeism (1.9%), which contradicts the data from the CCH survey. This discrepancy could be due to the fact that the CCH surveys correspond to a different time period.

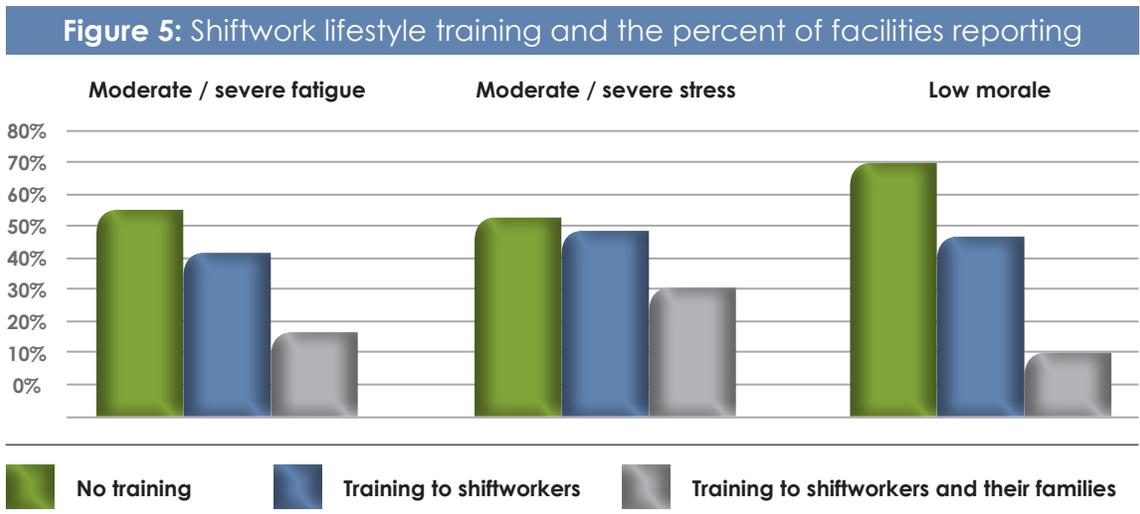


1 CCH INCORPORATED, CCH Unscheduled Absence Survey 2006. <http://hr.cch.com>, 2 CCH INCORPORATED, CCH Unscheduled Absence Survey 2007. <http://hr.cch.com>, 3 Bureau of Labor Statistics: <http://www.bls.gov/cps/cpsaat46.pdf>

Fatigue/Stress/Morale:

Shiftwork Practices 2017 survey shows that facilities that provide lifestyle training have lower rates of moderate/severe fatigue and stress and better morale (Figure 5). As noted above, providing training to shift workers and their families produces significantly better outcomes than providing training only to shift workers.

In addition, other savings may also be possible, such as decreased health care costs, safety incident costs and workers' compensation costs, and increased productivity.



CIRCADIAN SHIFTWORK LIFESTYLE TRAINING CASE STUDY

A joint study by CIRCADIAN and a major surface mining company found a positive impact on a group of heavy equipment operators who were provided training on "Managing a Shiftwork Lifestyle" (Kerin and Aguirre 2005).

CIRCADIAN's "Managing a Shiftwork Lifestyle" program is delivered in one, four-hour session and is specifically designed to assist shift workers in coping with the unique challenges associated with working long, irregular, or night and evening shifts. This program contains the elements necessary for a successful training program. Prior to delivering the training session, management support is obtained, and a target audience identified. Through informal discussions with management and when possible employees, the needs and goals of the target audience are identified and incorporated into the training curriculum. The interactive training sessions are scheduled during company time, consist of small group workshops conducted by an expert trainer and include participation of spouses or partners. The training content includes practical information on how to get better sleep during the daytime as well as the nighttime, healthy diet, managing fatigue and alertness levels, and balancing work and home life.

The study began with the collection of baseline data. Employees completed a diagnostic survey about their sleep habits, diet, family/home life, fatigue, alertness, health and safety to establish a pre-implementation baseline. The survey includes a series of scientifically validated instruments, such as sleepiness index, gastrointestinal index, and sleep disorders risk. It also assessed the sleep obtained and the employees' attitudes about their shift schedule. In addition, a sample of operators completed sleep/wake logs for a 28-day shift cycle. After this initial data collection, the operators and their spouses/partners attended the "Managing A Shiftwork Lifestyle" training workshop. Approximately six weeks following the training session, operators filled out an additional month of sleep/wake/work logs and completed a post-implementation survey. The pre- and post-implementation data were then compared to determine the impact of the training.

Healthy eating and digestive problems

Heartburn, indigestion and other forms of gastrointestinal problems are frequent complaints for shift workers. After the training, the gastrointestinal index of the training participants improved significantly, dropping from a score of 17.9 to 13.6 (compared to the U.S. average of 12.7). This finding correlated well with other results from the survey that indicated a high percentage of operators after the training became more aware of good nutrition practices and were incorporating healthy eating habits into their lifestyle. It is important to note that the reduction in the gastrointestinal score potentially represents a reduction in medical costs for the company.

In addition, excessive use of caffeine, which was defined as drinking more than four 10 oz. servings in a 24-hour period, decreased from 24% of employees to 16% during days off and from 32% to only 8% of participants drinking 4 or more cups of coffee during the night shifts.

Sleep and alertness

One of the more notable results of the study was a significant increase in average daily sleep length. In the pre-implementation data, the overall average sleep length was 7 hours 33 minutes. This included sleep on days off, as well as days at work. Following the training, the overall average sleep length increased by 16 minutes to 7 hours 49 minutes.

Figure 5: Average duration of daytime sleep obtained (when working night shifts) prior to shiftwork lifestyle training and after the training program.



Even more compelling was that the amount of daytime sleep obtained (when working night shifts) increased a full hour to 5.8 hours, as compared to the 4.8 hours obtained prior to the training (a 21% increase). This additional daytime sleep when working night shifts can be attributed to a better understanding of sleep and sleep management techniques.

The 21% increase in daytime sleep is further reflected by the fact that 67% of those surveyed reported getting more than 5 hours of daytime sleep when working night shifts, compared to only 45% prior to the training. This is also confirmed by the fact that prior to training, 82% of the participants had stayed awake for more than 18 hours at some point in the previous week, while after the training only 67% had done so. More than half (54%) of those surveyed indicated making changes in their sleeping environment to further enhance their ability to get to sleep and stay asleep, especially during the daylight hours when they were working the night shifts.

Family/social life

Although there was no schedule change associated with the training, there were some significant differences between the pre- and post-implementation data with regard to the employees' perception of the schedule. For example, before the training, 41% of those surveyed found it "very" or "often" difficult to fulfill domestic responsibilities; after the training, only 23% felt that way. Similarly, 46% having reported difficulty finding adequate time for entertainment and recreational activities prior to the training, compared to only 23% after the training. This can be attributed to a generally better overall management of work and family balance following the training and/or an understanding of the accommodations needed for the shift worker by family members.

The results showed a positive impact of the training was readily apparent in the post-implementation data analysis. Both the employee survey and the sleep/wake/work log analysis confirmed overall marked improvements resulting from the shift work lifestyle training. These results underscore the need to provide training and education for 24/7 workforce employees on how to better manage the special issues and challenges they face. At the very least, there is a compelling case to provide training on "Managing a Shiftwork Lifestyle" for every new shift worker as part of a company orientation program for new hires.

Although training alone is not sufficient for a comprehensive fatigue risk management system, the results of this study indicate that it can serve as a core element. Combined with scheduling improvements, more supportive policies and procedures, and strategic informational support publications, lifestyle training can provide a substantial Return On Investment for 24/7 operations, while improving the health, safety and quality of life of their employees.

In the final analysis, the program was very well received by both managers and operators. Employee's feedback was that they felt better and were more alert after managing a shiftwork lifestyle training. Operations Managers stated that, "Overall, the program was a very positive breakthrough". Given the participants' improved quality and quantity of sleep and decrease in gastrointestinal issues, it is also expected that employer costs (e.g. healthcare costs, safety incident costs, etc.) would decrease as a result of employee lifestyle training.

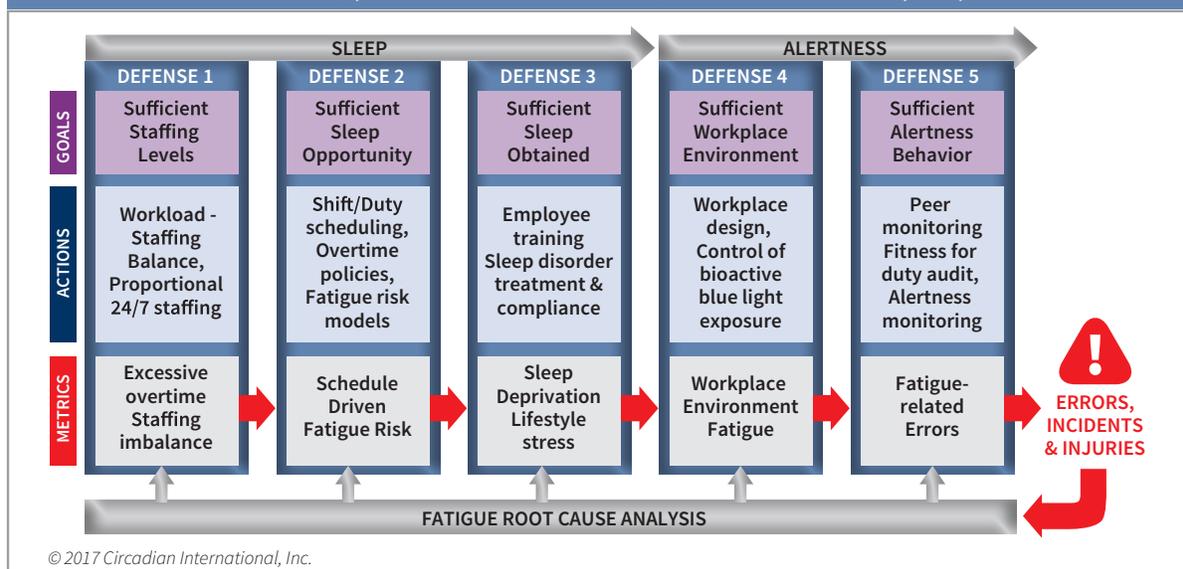
FINAL CONCLUSIONS AND RECOMMENDATIONS

While everyone is vulnerable to the health and safety risks of on-the-job fatigue, shift workers face significantly greater health, safety, and social challenges as a result of fatigue, than their day-working counterparts. Shift workers experience more human errors and accidents, chronic health conditions and family and social challenges, increased absenteeism and turnover, and lower productivity. These health, safety, and social challenges not only directly affect the shift worker employee, but the employer also incurs extra costs as a result of increased absenteeism, turnover, medical care, safety incidents and production errors.

The gold standard to addressing the challenges of workplace fatigue is a Fatigue Risk Management System (FRMS), a scientifically based system with multiple components, driven, implemented and improved by data and involving the participation of management, employees and union representatives (when possible). An important component of any FRMS is the inclusion of an education, training and awareness program that addresses all aspects of the shiftwork lifestyle and behavior that impact fatigue, in addition to environmental factors (e.g. light, noise) (Wong et al., 2019).

Worksites not only provide a natural social context, but workplace interventions have the potential to reach large numbers of people, including individuals who otherwise may not be motivated to engage in activities promoting a healthy lifestyle (Lassen et al., 2011, Guazzi et al., 2014).

Figure 6: The five major lines of defense used in designing and implementing a Fatigue Risk Management System and the feedback loop which analyses fatigue-related errors & incidents and strengthens defenses to ensure the FRMS is risk-informed, performance-based, and continuously improved.



The scientific literature, as well as CIRCADIAN's experience, clearly indicate that targeted programs can positively affect the lifestyle of shiftworkers and provide measurable benefits for the company, its employees, and their families. Both employers and employees stand to gain from the investment in group-based lifestyle education and training programs. Employees improve alertness levels, health and quality of life, gaining skills and information to lead a healthier life and employers reap the anticipated financial healthcare and operational savings from lowered health care costs, decreased absenteeism and fewer accidents.

As economic growth in the U.S. continues to increase, companies must ensure that they stay competitive by putting programs in place that minimize the costs incurred from absenteeism, turnover, and human error related incidents. Training that educates employees and gives them the tools needed to better cope with their rigorous shiftwork lifestyle, combined with other support programs such as bio compatible shift scheduling and staffing optimization, provides an opportunity for making breakthrough reductions in operating costs.

ABOUT CIRCADIAN™

CIRCADIAN is the global leader in providing 24/7 workforce performance and safety solutions for businesses that operate around the clock. Through a unique combination of consulting expertise, research, software tools and informative publications, CIRCADIAN helps organizations in the 24-hour economy optimize employee performance and reduce the inherent risks and costs of their extended hours operations.

Working from offices in North America, Europe and Asia, CIRCADIAN experts ensure that over half the Fortune 500, and other leading international companies, thrive in the global 24/7 economy.

CIRCADIAN's core expertise is the staffing, scheduling, training and risk management of their most vital asset - the 24/7 workforce. Founded in 1983 by Dr. Martin Moore-Ede, a former professor at Harvard Medical School and author of the best-selling book "The Twenty-Four Hour Society", CIRCADIAN has led the development of innovative new technologies and tools to enable employees to successfully adapt to today's high performance 24/7 workplace.

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