

Chapter 2

New Employee Accident Rates

2.1 Introduction

At its broadest level, there are three different bodies of research that have addressed new employees' occupational accident rate. All three literatures clearly show that an employee is more likely to have an accident at work in their initial period of employment in a job. The larger two bodies of literature are those which have examined the relationship between job tenure and accidents, and the relationship between age and accidents. The age literature has tended to focus on young or youth worker, and these workers are often new employees (have relatively short job tenure), but this is not always the case. Generally, the research on the relationship between age and accidents has not attempted to disentangle the relationship between age and job tenure. Nevertheless, and despite some interpretation difficulties, I will examine this literature. Finally, there is a small literature which has looked at the relationship between employee turnover rates and accidents, which is also suggestive of safety issues associated with new employees. Overall, it seems clear that new employees are a safety risk and may even be classified as a safety hazard.

Many safety risks and hazards in workplaces are constant or static. Such risks can be identified, and either removed, guarded against and/or appropriate warnings put in place. That is engineering and ergonomic interventions can help protect employees from known risks and hazards. Furthermore, employees can be trained in ways to cope with or avoid constant or static workplace' safety risks and hazards. In contrast to constant or static safety risks, many organizations have a dynamic workforce which can be relatively constant in size, but continuously changing as people resign and new employees come onboard, or constantly growing in size as operations ramp up, which also sees new employees coming onboard. This flow of new individuals into a workplace can be characterized as a flow of risk and hazard into the workplace in the form of the behaviors and attitudes which the new employee brings to the job.

A new employee is defined as any individual that has recently started a job. Some research has used the term *newcomer* to describe a new employee (e.g., Molleman and van der Vegt 2007). As will be discussed below, a new employee may also be relatively young (e.g., a youth worker entering their first job), but this is not always the case. The label of *new employee* equally applies to an individual that has previously worked in another job, or in other jobs: They are new to job they enter irrespective of their past employment history. Chapter 3 discusses the relationship between experience and accidents, and describes how even an experienced new employee is still initially a safety risk.

Finally, the research examined below tends to link variables within cases; for example, data on accidents, age, and job tenure are collected from the same employee (sample of employees) and correlated. While this research clearly shows that new employees suffer accidents, it potentially misses the impact of new employees on their co-workers' safety. It is also very likely that some of the accidents suffered by employees that have been working for an organization for some time (what might be termed senior employees) may involve a new employee as part of the causal mechanism. Indeed, responsibility for industrial fatalities/accidents has been associated with the fellow worker for over 100 years (see Eastman 1910; Swuste et al. 2010). Thus, overall, new employees are both a safety risk to themselves and potentially a safety risk to all employees in an organization.

2.2 Job Tenure and Accidents

A number of different approaches have been taken by researchers examining the relationship between accident statistics and employee job tenure (how long the employee has worked in the job). In some studies, researchers have formed groups of employees based on their job tenure and compared accident rates across the groups. Unfortunately, not all studies that have used this group comparison approach to study the relationship between job tenure and accidents have attempted to control for employee age across the groups. Other studies have used job tenure as a predictor variable in regression analysis or simply correlation analysis in an attempt to find associations between an employee's job tenure and accidents.

A useful example of a study which attempted to identify the unique contribution of a large number of demographic variables (including age) and job-related variables (including job tenure) to workplace accidents was conducted by Leigh (1986). Their analysis used a sample of 4962 draw from the University of Michigan's Panel Study of Income Dynamics for 1978 and 1979, and used logistic regression to analyze relationships. From the perspective of this chapter, a key finding was that the length of time with the job (job tenure) was negatively associated with accidents: Participants with shorter job tenure reported more accidents. Or stated in a different way, new employees had a higher accident rate.

Examples of studies that have looked at accidents within groups defined by employee tenure often focus on specific industries. While such studies may have

limited generalizability to other industries, they do tend to focus on the most dangerous occupations/industries and are therefore very valuable in adding to our understanding of occupational accidents. Bennett and Passmore (1984) examined studies conducted on the coal mining industry, noting that at least at the time it was the most dangerous occupation in the US. Bennett and Passmore (1984) reviewed three studies (i.e., Theodore Barry and Associates 1971, 1972; Root and Hoefer 1979) which clearly indicate that job tenure is a significant factor in coal mine accidents. Theodore Barry and Associates (1971) examined a database of 731 fatal underground coal mine accidents and found a strong negative relationship between fatalities and job tenure. Theodore Barry and Associates (1972) examined 688 underground coal mine fatalities and found that in 31 % of the cases, the employee had less than one year of job tenure, and in 7.8 % of the cases, the employee had less than one month of job tenure. Root and Hoefer (1979) examined approximately 270,000 work injuries from ten US states that participated in the Bureau of Labor Statistics Supplementary Data System for 1976 and 1977. Forty percent of the injuries reported had occurred during the first year of employment, and half of these occurred during the employees' first 3 months on the job.

The association between job tenure and accidents in the mining industry is also apparent in more recent studies. Groves et al. (2007) examined Mine Safety and Health Administration (MSHA) and Current Population Survey (CPS) data for equipment-related injuries over the period 1995–2004. Of the 86,398 injuries examined, 28 % occurred to employees in their first year of job tenure, and of the 597 fatalities examined, 31 % occurred to employees in their first year of job tenure. Furthermore, for both injuries and fatalities, the percentages associated with the first year of tenure in a job were by far the greatest identified. At this point, it is important to note that the above studies are not focusing on people in their first job, rather the statistics relate to job tenure, not the participants' overall employment tenure.

Similar patterns of relationship between job tenure and accidents emerge from data relating to other industries. For example, Bentley et al. (2002) reported that 32 % of injuries on logging skid sites occur within the workers' first 6 months of employment. McCall and Horwitz (2005) reported that 51 % of the 1168 trucking accident claims they examined were made by drivers with less than one year of job tenure. Chi et al. (2005) found that 80.5 % of the 621 fatal occupational falls in the Taiwanese construction industry which they analyzed had occurred in the individual's first year on the job. Jeong (1998) examined national statistics on industrial accidents in the construction sector in South Korea in the years 1991–1994 and found that 95.6 % of the 120,417 non-fatal injuries and 92.5 % of the 2,803 deaths examined had occurred in the employees' first year on the job. Also see Bell and Grushecky (2006), Cellier et al. (1995), Haller et al. (2009), and Kincaid (1996) for other data showing that new employees have higher accident rates when compared to more senior employees.

Much of the research on the relationship between job tenure and accidents has reported or is suggestive of a negative linear trend. That is as an employee's job tenure increases, their likelihood of an accident decreases. But there are exceptions.

Keyserling (1983) used a quasi-experimental design to explore the relationship between job tenure and accidents, by grouping employees into several categories. They found that individuals in a probationary employee group (those with less than 3 months of job tenure) and individuals in an experienced worker group (those with a minimum of one year of job tenure) had fewer accidents than employees in another group with 3 and 12 months of job tenure. They suggested that the relationship between job tenure and accidents is better characterized as an inverted U-shaped relationship, rather than a negative linear relationship. This is an important finding. In particular, it raises the very important question of what happened in the first 3 months of employment that ‘protected’ new employees in their sample from accidents? Perhaps, in this organization, new employee safety was actively managed in their initial period of employment.

Figure 2.1 shows three hypothetical relationships between job tenure and accidents. Clearly, there is evidence to support the possibility of both a negative linear relationship and an inverted U-shaped relationship between job tenure and accidents. Furthermore, it is likely that organizations may experience either, or both of these relationships. The ideal situation is shown by the dotted line in Fig. 2.1, where

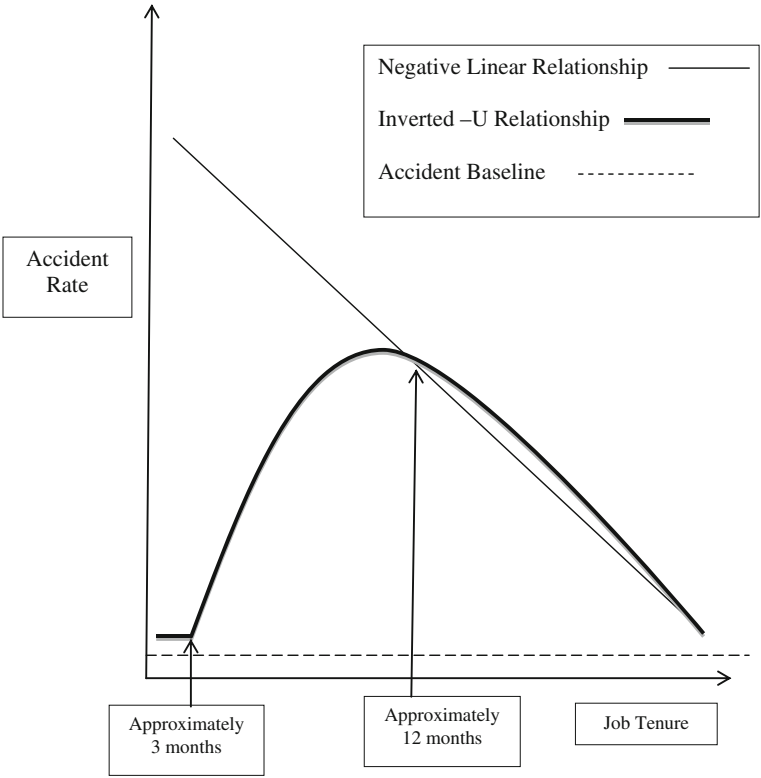


Fig. 2.1 Hypothetical relationships between job tenure and accident rates

the accident rate of new employees is no more than the base level of accidents (hopefully zero) which the organization or specific occupation has historically recorded. The overall objective of this book is to help organizations achieve this zero accident rate outcome for new employees.

While the weight of research evidence seems to overwhelmingly show a relationship between job tenure and accidents, and this book will offer a number of reasons for this finding, it is worth noting that some of the difference in accident rates between new and more senior employees could be due to a sampling bias problem. There is a possibility that the occurrence of accidents has a selection effect on employees. That is employees that have accidents early in their employment may remove themselves from the employment because they are injured or have pressure put on them by family members to get a safer job, etc. This selection process may result in more senior workers (those with longer job tenure) being a selected group of employees (perhaps a group that are very safety conscious). Such a selection bias could exaggerate the difference in accident rates in studies which have used cross-sectional designs to compare accident rates between new employees and more senior employees. While this selection bias probably does occur, it really only explains why senior employees potentially have fewer accidents, not why new employees have many accidents.

2.3 Employee Age and Accidents

One of the most comprehensive reviews of young workers' (under 25 years of age) occupational accidents was conducted by Salminen (2004) (also see Castillo 1999; Rhodes 1983; Laflamme and Menckel 1996; Salminen 1996 for earlier reviews). Salminen's review was interested in two key questions: Do young workers have higher rates of occupational injuries? And do young workers have more fatal accidents? Salminen identified 63 studies which had addressed the first question and 45 studies relevant to the second question. The studies as a whole were conducted in many different countries (i.e., America, UK, Japan, Holland, Sweden, Israel, New Zealand, Australia, Canada, Finland, Germany, Denmark, France, Jordon, Norway, Brazil, China, Taiwan, and Iceland). Fifty-six percent of the studies on non-fatal injuries found that young workers had a higher injury rate than older workers, whereas 64 % of the studies on fatal injuries showed that the rate was lower in young workers. Collectively, the data examined in Salminen's review support the notion that young workers are more likely to be injured at work, although thankfully this injury may not be fatal. As might be expected, there was considerable variation in findings across the studies and also across the industries where the studies are sampled. While the interested reader can consult the review for the specific details—the message is clear, organizations need to give consideration to the very strong possibility that young workers will be involved in an accident.

Salminen's (2004) review does not attempt to provide many detailed explanations for their findings. That is they do not attempt to explain why young workers suffer more non-fatal accidents (apart from suggesting that young workers may lack experience or are less likely to be killed by an impact which would probably kill an older worker—the latter not being a very comforting explanation). The review also does not address whether the young workers (classified as aged less than 25 years in their review) were in fact new employees. While it is probably reasonable to assume that many young workers in the studies reviewed were in fact new employees, some may have already been working for several years (possibly up to 10 years depending on the minimum school leaving age in the various countries represented by the reviewed studies).

The difficulty associated with disentangling the age/job tenure relationship in many studies is due to the large age ranges that are often used to form the youth worker or young worker group. For example, Laflamme (1996) who examined aged-related accident risks in the Swedish Automobile industry using a well-designed retrospective longitudinal study identified higher accident rates among young worker (aged 16–24 years), but failed to account for the potential of an 8-year within-group job tenure difference. Of course, this is not always the case. For example, Scott et al. (2004) reported that Australian youth workers in the 15–17 years of age group were twice as likely to experience a work-related injury as other workers, and it might be reasonable to assume that job tenure for this group was relatively short, given that the youngest age at which an individual can leave school in Australia ranges from 15 to 17 depending on state.

Other results which illustrate the likelihood that many accidents associated with age are occurring because the employee can be classified as a new employee are provided by the studies of Lin et al. (2008) and Van Zelst (1954). Lin et al. (2008) found that males aged 24 years or less had the highest rate of fatal occupational injuries in an analysis of 1890s accident reports filed between 1996 and 1999 in Taiwan. However, the truly revealing statistic in Lin et al.'s (2008) study was the finding that when length of work experience (job tenure) was known, which was the case in a total of 977 of the 1890s accidents examined, 61.5 % of the fatal accidents had occurred during the first year of employment.

Van Zelst (1954) examined a group of employees ($N = 297$) that had a mean age of 39.2 years but who were inexperienced in the type of work being performed (they were new employees) and found a higher-than-normal accident expectancy rate in their initial period of employment. The normal accident expectancy rate was defined as the organization's baseline level of accidents. Thus, being older did not seem to remove all safety risks associated with being a new employee. However, the study also found that the group's accident rate did reach the normal accident expectancy level at approximately 2 months of job tenure. Chapter 3 discusses the generalizability of workplace experience from one job to another, which may partly explain Van Zelst (1954) finding.

In summary, there are characteristics associated with age which can increase the possibility of an accident. For example, the anthropometric characteristics of youth and adults are different, and machinery may well have been designed to

accommodate the anthropometric characteristics of an adult working population. Furthermore, there are also a number of psychological attributes associated with youth which can increase the possibility of an accident: poor judgment, sensation-seeking, poor risk assessment, vulnerability to peer pressure, incomplete self-image, pressure to excel, proving one's independence and maturity, and a need to rebel tend to be characteristics associated with youth. However, it is also the case that many youth workers are also likely to be new employees. Throughout this book, it will be argued that a lot of the safety risks which youth (young) workers experience are due to their new employee status, rather than specifically because of their age or factors associated with their age.

2.4 Employee Turnover Rates and Safety

Given that there is clear evidence that employee job tenure and accident rates are associated, it might be expected that there would be a body of research evidence showing a relationship between employee turnover rates and accident/incidence occurrence. That is organizations that have high voluntary turnover, where the employee leaves and the organization replaces them, are likely to have high accident rates associated with the volume of new employees entering the workforce. There is of course a reasonable volume of research on the factors associated with employee turnover. However, the safety factors associated with employee turnover appear to be rarely mentioned.

The research evidence on the relationship between employee turnover and organizational performance is somewhat mixed and has tended to focus more on the good effects of employee turnover on organizational performance. For example, it is possible that a low-to-moderate degree of turnover may be good for an organization, in that the low-to-moderate level of turnover may be sufficient to remove poor performers (Abelson and Baysinger 1984), introduce new knowledge and skills (Alexander et al. 1994), and reduce employee homogeneity and increase diversity (Schneider et al. 1995). However, throughout this book, I will argue that any level of employee turnover can potentially be negative for safety performance.

While the vast majority of research on employee turnover has not examined its impact on safety, Shaw et al. (2005) is a notable exception. Furthermore, Shaw et al.'s (2005) study appears to have prompted safety to be included as a performance dimension in recent models of the relationship between employee turnover and organizational performance (e.g., see Fig. 2.1 in Shaw 2011). Shaw et al.'s (2005) study suggested four alternative relationships between employee voluntary turnover and organizational performance (with safety included as one dimension of performance): linear negative relationship, inverted U-shaped relationship, attenuated negative relationship, and the HRM-moderated relationship. For the linear negative relationship, Shaw et al. (2005) used Staw's (1980) suggestion that high turnover would deplete the resources that are available to do what might be termed *optional activities* such as maintenance, and the lack of these optional activities

could have a negative impact on safety. In the case of an inverted U-shaped relationship, the general argument is that a low level of turnover is good for organizational performance (as noted above). While Shaw et al. did not speculate how this low level might be good for safety, it is possible that a new employee (despite the many risks they bring, as will be discussed in other parts of this book) might also bring with them new safety ideas. The ‘attenuated negative effects of turnover on performance relationship’ basically refers to the prediction that as the turnover rate increases, the human capital loss associated with each individual that leaves is lowered. Put simply, the individual leaving probably has not been there that long anyway (given the high turnover rate) and as such has not acquired that much organization-specific human capital. Thus, the negative impact of their voluntary turnover on organizational performance is reduced (attenuated) by the high overall rate of turnover (their short job tenure). In terms of safety, if the organization has a continuously high turnover rate, its base level of accidents may be rather high—lots of new employees and lots of accidents. Finally, in the case of a HRM-moderated relationship between turnover and performance, it is argued that the consequences of turnover on performance vary as a function of HRM practices. In relation to safety, the material in this book relating to practices and processes to reduce new employee safety risks should result in an HRM-moderated relationship between employee turnover and safety performance. Overall, no matter how one looks at employee turnover, there is clearly potential for turnover (and the associated arrival of new employees) to negatively impact workplace safety.

2.5 Can the Problem of New Employee Safety Risks Get Worse?

There are a number of reasons why it might be expected that the number of new employees in organizations might steadily increase. While the safety issues associated with new employees, without any major changes to current practices, are likely to remain stable (the same), accident statistics associated with new employees are likely to show increases simply because there are likely to be more new employees entering organizations. In the following four sections, reasons why the number of new employees is likely to increase are examined: predicted global employee turnover rate increases; retirement of the baby boomer generation; the nature of the contemporary workforce; and recovery from the global recession.

2.5.1 Predicted Global Employee Turnover Rate Increases

Evidence is mounting which suggests that employee turnover rates are steadily increasing. A paper published by the Hay Group (2012) based on research in

association with the Centre for Economic and Business Research (CEBR) claimed that globally, the number of workers leaving their jobs is expected to have reached 161.7 million by 2014. Furthermore, the paper claims that as the global economic recovery takes hold, dissatisfied workers will take the opportunity to change jobs. The Asia-Pacific region was specifically noted as likely to see a turnover rate increase from around 21.5 % in 2012 to 25.6 % by 2018. The paper also listed expected turnover rates for 2013 in India of 26.9 %, Russia 26.8 %, Indonesia 25.8 %, Brazil 24.4 %, US 21.8 %, China 21.3 %, and UK 14.6 %. Clearly, these figures not only point to millions of employees leaving their job, but also imply that millions of individuals are going to become new employees.

While it is clear that the predicted employee turnover rates mentioned above are across the entire employment sector, and some of the industries represented by these statistics may not have much in the way of work-related safety issues (e.g., an employee working in a service job is generally exposed to a less dangerous work context, compared to an employee working in mining), a number of industries that operate in high-risk work situations have reported difficulties retaining newly hired employees. For example, Delgoulet et al. (2012) reported this was the case in the construction sector in France.

Many reasons have been offered for why employees do not stay with their employer, with perhaps the single most dominant cause being dissatisfaction with some aspect of the employment situation (e.g., see models by Griffeth et al. 2000; Hom and Kinicki 2001). The centrality of satisfaction is also noted in several reviews of turnover-associated variables (e.g., Burt 2014; Holtom et al. 2008; Hom et al. 2012; Park and Shaw 2013; Shaw 2011; Shaw et al. 2005). One aspect of the employment context which an employee may be dissatisfied with is safety. That is one factor which is known to increase turnover intentions, and ultimately employee turnover, is employee's safety risk perceptions (Cree and Kelloway 1997). Thus, while employee turnover may 'cause' safety problems associated with new employees, it is also possible that safety issues can also cause employee turnover. Interestingly, or perhaps surprisingly, there seems to have been very little research attention given to the possibility that dissatisfaction with safety may be a motivating factor for voluntary turnover.

It is possible that employee turnover and the increased safety risks associated with new employees, starts a cycle or even what might be termed a new employee associated risk avalanche. If we assume that a new employee is a safety risk (and as outlined above, there is very good research evidence to support this assumption), their addition to the workplace may increase the risk perceptions of other employees. That is if an employee sees new employees being injured, killed, or creating hazardous work circumstances for other employees, their perceptions of safety risks associated with the work may increase, and their satisfaction with workplace safety may decline. This may lead to the employee resigning from their job, creating the need to employ a new employee, and that new employee further increases the risk perceptions of other employees, leading to further resignations and so on.

It really is unsurprising that employees who perceive their work or their workplace is unsafe (risky) begin to consider whether it is a good idea to remain in the job. Hirschman (1970) proposed the ‘exit–voice’ model of the response to high safety risk. Put simply, employees faced with unacceptable safety risk ‘talk with their feet’—they leave. The exiting employee creates a vacancy, and in filling this vacancy, the organization may be adding more risk to the workplace in the form of another new employee. This could be characterized as a cycle where risk prompts resignations, which prompts the recruitment of new employees, which increases perceived risk, and so on. Eventually, if the cycle is not broken, the organization may face a risk avalanche where the workplace is predominantly staffed with new employees, and the accident rate is increasing.

2.5.2 Retirement of the Baby Boomer Generation

The baby boomer generation, undoubtedly well over a 100 million people globally (with roughly 78 million in the US alone, Callanan and Greenhaus 2008), who were born in the 20 years post–World War II, are now entering retirement age (65). While there are many efforts to keep this valuable human resource in the workplace (e.g., Callanan and Greenhaus 2008; Dohm 2000), the baby boomers will inevitably retire at some stage. A significant volume of literature has addressed the labor shortages which will be associated with the retirement of the baby boom generation (e.g., Cappelli 2005; Dohm 2000; Lewis and Cho 2011). While some authors have noted how the retirement of baby boomers might be good for organizations, through the introduction of new ideas and motivated staff, there clearly are some safety disadvantages associated with an influx of new employees.

One major disadvantage that is very clear (although there appears to be little if any research literature on it) is that where possible, and for some jobs, in some places, there are likely to be labor shortages, and the knowledgeable, skilled, and experienced baby boomers are going to be replaced with substantially less knowledgeable, skilled, and experienced individuals. Put simply, retiring baby boomers are going to be replaced with new employees. Clearly, from the perspective of this book, the mass retirement of the baby boomers over the next couple of decades is going to see a roughly equally inflow of new employees into workplaces. Given the statistics reported above, it is clear that without well-considered interventions, the retirement of the baby boomers is going to be associated with an increase in workplace accidents, death, and injuries.

2.5.3 Nature of the Contemporary Workforce

The twenty-first century has seen a change in the way organizations form their workforce. What might be termed the contemporary workforce is somewhat

different to traditional work/employment relationships, with more emphasis being placed on short-term, temporary, or fixed-term contracts. Associated with this is an increase in the frequency of changes between jobs and workplaces (Papadopoulos et al. 2010). Indeed, it has been reported that individuals change jobs 10.2 times on average in each 20-year period (Bureau of Labor Statistics 2005). Clarke (2003) discussed in some detail the impact of the contemporary workforce on the development of organizational safety culture, noting how safety culture requires (among other things) an opportunity to develop relationships based on trust (see Chap. 7 for a further discussion of trust development). Clarke argued that a workforce that is characterized by short tenure (a contemporary workforce) is going to face difficulties in achieving the degree of integration and interaction required for safety culture development. Koukoulaki (2010) also gives an excellent overview of a number of effects on safety that may result from the changing work environment.

All of the characteristics of the contemporary workforce point to an increase in new employees in organizations. If an organization uses short-term temporary, or fixed-term, contracts, they are creating a continuous or semi-continuous flow of new employees into the organization. The same can be said for the use of project-based employment, where individuals are employed for a specific project, or for the use of subcontracting, or for the use of temporary agency staff. While such staffing arrangements may show cost saving on one line of a balance sheet, they may also increase costs associated with accidents, which in the long term may reduce the apparent savings to zero, or even make it more costly to adopt a contemporary workforce arrangement.

2.5.4 Recovery from the Global Recession

Clearly, there are parts of the world where the global economic recession has not fully lifted. However, other countries are showing positive economic growth, decreases in unemployment rates, and increases in the creation of new jobs. It is likely that economic growth will continue to increase and spread to other parts of the globe. Associated with this recovery will be vast numbers of individuals entering employment, becoming new employees. Thus, while productivity gains are likely for many sectors, increases in accidents due to increases in the number of new employees are also likely.

2.6 Conclusions

Despite variation in study methodology, and causation around potentially confounding issues, the overwhelming weight of evidence clearly indicates that the likelihood of an accident is greatest in the initial period of employment, when the individual is a new employee. There are also a number of reasons why the

proportion of new employees in organizations is likely to increase. Unless a systematic approach is taken toward managing new employee safety risks, an increase in accidents will parallel the arrival of new employees. The remaining chapters of this book examine a number of factors which may contribute to new employees' high accident rate, and offer suggestions for the management of each factor.

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