

Editorial

From cotton mills to composites; has the world of work really changed?

The last two hundred years has witnessed a remarkable transformation in the world of work. In the early 19th century, the industrial revolution introduced the ability to mechanise processes previously performed by people. As a consequence, workplaces became larger and more complicated. Change was not limited to the physical nature of the workplace: workers were also required to work differently, and interact with work in different ways. Work became more organised, ordered and systematic. Many of these changes brought about the transformation of not only the workplace, but also the working population and the economic prosperity of some parts of the world.

A typical example of such progress was seen in the processing of textiles. These changes led to a transition within the textile industry; cotton processing, once small scale, became mechanised and was now able to be carried out on a much larger scale, in multi floored, grand, brick built cotton mills. These workplaces employed many hundreds of workers, and were highly profitable. However, the prosperity of these mills was dependent on the availability of a productive workforce, who were skilled in the application of the required activities. Therefore, successful employers needed to think more creatively about their workers and their workplace in order to maintain production at their maximum levels.

Quarry Bank Mill, near Manchester in the UK, is one example of such determination to provide better working conditions. Offering both housing and pastoral care for workers, this workplace was regarded as ahead of its time. On the banks of the River Bollin, which they used to power its water driven machinery, this mill processed raw cotton imported from distant locations from around the world. The first mill on this site was built by Samuel Greg and John Massey in 1784, and in 1790 the first apprentice house was built to accommodate child apprentices. The approach adopted was to care for the pastoral, educational and medical requirements of the workers and their families, and as a consequence a mill doctor was appointed. These approaches allowed Quarry Bank Mill to develop a community that offered not only decent living standards

but also social support to their workers, with the concomitant benefit to the mill owners of a more healthy workforce than was afforded by the general population.

Despite these physical changes to workplaces, well developed risk management processes to reduce health risks at work were not yet evident. Although mill workers were offered very decent and improved living and working condition in certain circumstances, they were still at risk of the now well described health conditions including chronic bronchitis and byssinosis.

The approach taken at Quarry Bank was seen elsewhere in later years, and with similar success. William Lever, who conceived and built the worker village at Port Sunlight in 1887, developed a community to house and support workers for his soap-making factory. Housing and other high quality local amenities were built, including a cottage hospital. A similar development was also seen in Saltaire, Yorkshire, where in 1853 Sir Titus Salt built a village to house the needs of his textile workers. Importantly, the architect was asked to include washhouses supplied with fresh water, educational facilities, a hospital, library, a science laboratory, a gym and even a concert hall.

The workplaces of today would probably seem unrecognisable to those individuals employed 200 or more years ago. Clearly, modern workplaces differ physically from their historic counterparts, not only in how and from what they are constructed, but also in how workers are required to carry out work within them, and this change is predicted to continue at pace as our economies become more globalised. In addition, global demographic change is having an impact on the nature and culture of workplaces. Many countries have increased the retirement age, and this trend will continue so that future generations may be working with their grandparents and great-grandparents. Technology is boosting jobs in knowledge intensive sectors, whilst contributing to the decline of hard, dangerous and dull jobs. The trend for less manual work and more ‘people’ (knowledge) work is expected to continue.

The physical structure of work is being replaced by a virtual structure, with remote working via mobile devices

likely to become the norm. Global mobility of workers and new technologies are bringing together different cultures, religions, races and languages. New occupations and an increasingly globalised workforce will develop as companies service the needs of different national and international markets.

Along with changes in the physical work environment and the nature of the jobs themselves, the nature of potential exposures to health hazards at work is also evolving as a function of an increased understanding, for example, of chemicals and materials used as raw materials in manufacturing processes. There is increasing potential for exposure to new and novel workplace materials, as the nature of work becomes more complex. Indeed, newer specific exposures for workers include those within the nanotechnology and recycling sectors, work with new complex alloys, high value additive manufacturing approaches (3D-printing), constituents of bioengineering and composite materials.

The latter are emerging as a novel set of materials where a combination of a matrix, and a reinforcement material, exhibit properties superior to individual components alone. This is a complex area, but it is clear that these materials, when developed and used by humans, might lead to new and novel workplace exposures.

So how have the modern day equivalents of those early pioneers in workplace health, safety and wellbeing responded to this 21st century transformation in the world of work? Do today's employers use the principals established by those pioneers of the industrial revolution to maintain a healthy and productive workforce which is free of unplanned downtime caused by fatal accidents and workplace disease?

One might assume at face value that this is the case. For example, worker safety is now at an all-time high, and in the UK, for example, cases of workplace fatalities generally continue to fall year on year. By way of illustration, the Olympic build for the London 2012 games did not result any worker fatalities and was widely regarded as a major health and safety success. This must be contrasted with the earliest constructs that supported the Olympic ideals.

These statistics tell a success story, and this success may relate to the use of knowledge gained from understanding the reasons behind the failures of the past. However, safety statistics only tell half the story.

Workplace health statistics are more difficult to generate and also more difficult to interpret. What is evident is that worker ill health related to workplace exposures continues to be problematic in certain types of work. Good progress

has been made into tackling various traditional occupational diseases. Asbestos related diseases, for example, will eventually subside due to its effective removal from new work processes and certain causes of occupational asthma, including asthma due to latex in health care workers, have also declined because of its effect substitution with alternate agents.

Despite these successes, various problems remain unsolved. Flour has been recognised as a cause of asthma for many hundreds of years, and silica as a cause of the lung condition silicosis, but both these conditions are still being diagnosed in thousands of workers around the globe today. Perhaps more worrying is the rise in both common musculoskeletal disorders and occupational stress attributed to work.

Why might this be the case? Clearly, we still have much to learn about the interfaces between people, plant and processes in the workplace and the social and behavioural factors that lead to the development of ill health from workplace exposures to physical, chemical and psychosocial hazards. Modern work may not provide as much overall support to workers, such as that seen in Quarry Bank Mill, Port Sunlight and Saltaire. Workers may face increasing work isolation, longer unbroken working hours, increasing job demands, additional social responsibilities and may find it more difficult to gain support from fellow workers and friends. The financial downturn may have added further to these difficulties, as has the increased working life expectancy outlined above.

In addition, the regulatory context has changed significantly over the last two hundred years from a situation where there was no regulatory framework to one where global companies may have to operate under many different regulatory regimes depending on their geographic location. For example, some parts of the world have developed goal-based systems (e.g. the UK), which supports innovation by enabling the duty-holder to present a case for managing the risks; other areas of the globe have established prescriptive approaches which are very specific about what the requirements are to achieve effective control. "Progress" in Health and Safety overall may also paradoxically hold some blame for the increase seen in certain worker health problems. There has perhaps been a tendency for workplaces to compartmentalise their responsibilities, rather than taking a more rounded and complete view of what is most sensible to achieve at work in relation to health. Examples might include over reliance on successful safety solutions rather than a balance of health and safety approaches, reliance on "wellbeing" solutions

when basic hazard evaluation and risk assessments have not been carried out, or attempting to introduce workplace health schemes without appropriate employee engagement.

The world of work has clearly changed. Time will tell whether these newer approaches to worker health are superior to their predecessors. What is clear, however, is

that we still need to generate new knowledge regarding workplace health and safety risks, and to integrate this knowledge with what we already understand about effective control measures. In doing so we should be able to support the present to enable innovation in support of economic growth which is both healthy and safe for all of those individuals engaged in it.

David FISHWICK and Andrew D CURRAN

Health and Safety Executive, UK