Young workers: work-related risks and ergonomics

This is a reprint of the talk entitled "Inducting and integrating young people into work" given by Roland Gauthy to the 60th anniversary conference of the royal association of prevention advisors on 12 October 2006.

There is nothing surprising about the excess work accident frequency rate seen among young workers, and their over-representation in the health and safety statistics. It is a matter of basic maths: the biggest number of accidents and problems from ergonomic failures[1] happen in the jobs most exposed to work-related risk factors, and it is specifically in these accident-prone and health-threatening employment niches that most young people work.

A recent Quebec study[2] reported that these "young worker niches" are found in sectors where there are wide gaps between the 15-24 and older age groups in terms of frequency of exposure to work-related risks:

- 83% more for exposure to solvents;
- 61% more for exposure to the manual handling of heavy loads;
- 53% more for repetitive work;
- 38% more for strain from using tools;
- 40% more for night work.

While all these "ergonomic" conditions are intrinsically harmful, the study's authors also point out that these various constraints combine and add up more in young workers. In other words, the number of young people exposed to a combination of four or more of these constraints is materially greater than for any other age group.

The study also finds that "young people are not as healthy as we might think from their youth". For instance:

- 13% of young female office workers who have never been exposed to physical constraints at work have one or two health problems, including one chronic one. They have high levels of psychological distress;
- 11% of young male skilled or unskilled labourers who handle heavy loads and experiencing strain from using tools have one or two health problems, including one chronic one;
- 14% of young women in middle management, semi-professional or technician posts in the health care sector or social services do not feel in good health, with up to four reported health problems including musculoskeletal injuries;
- 8% of young men report from three to four health problems, including musculoskeletal injuries.

The worst-affected sectors and occupations are in construction, fishing and agriculture, clothing and footwear, the hospitality industry, personal and animal care, industrial assembly-line work, and so on. But, these are the very sectors where youth employment is highest, often in temporary or contingent jobs, and where disorders of the musculoskeletal system are most prevalent.

Another study on the link between time-in-post and work injuries shows a close correlation with inexperience and age[3]. It found that manual workers were the lowest average age group and had the highest percentage of work injuries during the first year, with young males being most at risk.

In a conference paper entitled "New employment, new risks", Elsa Underhill of Monash University's School of Management[4] notes that:

- a high proportion of young workers (in this case group apprentices and trainees) tend to be employed in higher risk occupations;
- young workers have a higher injury rate than older ones;
- group apprentices and trainees have a high rotation which exposes them to the risk of insufficient knowledge of workplace-specific hazards from constant job changes. Moreover, some group apprentices and trainees find themselves put on work that is not done by direct-hire employees and are not skill development tasks, like clean-up duties;
- group apprentices and trainees are more often employed by small businesses whose workers tend to be more vulnerable to injuries, less unionised and less able to assert their rights.

New jobs, including for young graduates, are increasingly contingent, and it is hard to find a good quality first job, as witness last spring's street protests in France over Prime Minister de Villepin's proposed CPE (first job contract). By "quality job", I mean a job that meets the European Commission's Laeken criteria[5]. Meanwhile, some sectors like the hospitality industry are desperately short-staffed ...

The dual challenge of youth and inexperience

These few facts lie behind my approach as an ergonomist to reducing the conflicts that may arise between prescriptive work requirements set in a given framework, and workers' experience of work as it is done in the real world[6]. The fact is that workers tend to compensate for and adapt – at the cost of their health – to operating deficiencies and unforeseeable hazards that could not be factored into job, machinery and task design[7]. The Quebec study mentioned earlier notes that as long ago as 1917, a steelworks was reporting 12 times more injuries among workers with fewer than 30 days' length of service. A consistent body of literature now shows that the dangers attendant on youth combined with

[1] Ergonomics (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance. This is the official definition adopted by the International Ergonomics Association.

[2] M. Gervais *et al., Conditions de travail, de santé et de sécurité des travailleurs du Québec*, IRSST, February 2006. Downloadable on www.irsst.qc.ca/files/documents/PubIRSST/R-449.pdf.

[3] F.C. Breslin, P. Smith, Trial by fire: multivariate examination of the relation between job tenure and work injuries, *Occup Environ Med*, 2006; 63:27 - 32. See: www.bmjjournals.com.

[4] E. Underhill, *New employment, new risks: an exploratory study of workplace injuries amongst Victorian group apprentices*, Annual Conference of Industrial Relations Academics of Australia & New Zealand, Monash University, Melbourne, February 2003.

[5] Job quality (10 dimensions): intrinsic job quality; skills, life-long learning and career development; gender equality; health and safety at work; flexibility and security; inclusion and access to the labour market; work organisation and work-life balance; social dialogue and worker involvement; diversity and non-discrimination; overall work performance. See: *Employment in Europe*, European Commission, 2002.

[6] Ergonomists talk of the conflict between prescribed work and real work, or task and activity.

[7] Technical faults and breakdowns, plant maintenance, miscellaneous disruptions, stock-outs, late deliveries, unplanned emergencies, staff shortages, etc.

inexperience rise where the job is insecure and involves exposure to multiple constraints. Which, as I say, is just basic maths.

Ergonomics alone cannot meet the dual challenge of youth and inexperience, still less so if its field of intervention – which may be reduced to biomechanical factors – disregards that a movement has a content, that it is rationalized, that it varies with perceptions and states of mind, and with cognitive (decisions to be taken according to inflow), sensory and emotional loads.

The real issue for the authorities, "prevention professionals", workers, employers, machinery and work systems designers is to give young job entrants the best possible induction. Giving constructive thought to risk factors should help create a climate for learning the right reflexes and movements, thinking preventatively and being constantly alert to hazards which they or their colleagues are exposed to. Proactive intervention by prevention professionals before workstations are designed or adapted, and their involvement in task and aid design when work tools are implemented, would help cut the toll of work injuries and damage to workers' health.

Occupational health is not something abstract observed by an occupational doctor during a regular check-up by reference to preset exposures, but a dynamic process that runs along a continuum: occupational health is developed, acquired and preserved. Conversely, the harmful effects, on the same continuum, damage health in the form of build-ups that are often perceived only after a certain time and above a certain threshold.

The danger of squandering one's health is all the greater and more serious for young people who are less attentive to the subtle indicators of health damage. I should like to illustrate that with a few thoughts about one of workers' main health complaints that results from exposure to what are called "ergonomic" risks, which, in the narrow view I have just criticised, means the risks of potential damage to the musculoskeletal system, especially when caused by the manual handling of heavy loads.

MSD and organisational factors

A series of recent French studies[8] have found evidence that manual handling work is spreading (rather than declining, as might have been expected after the European regulations came into force), that young manual workers are over-exposed, and uncomfortable postures are still highly prevalent.

In an interview with the *Le Monde* newspaper, Philippe Askénazy[9], a researcher with CNRS, claimed that work in France is dangerous, with occupational diseases and work injuries rising. He argues that we are paying the price of decades of neglect of health and safety at work while French business is now exposed to new challenges: an ageing population, emerging new risks related to technological and organisational changes, productivity and competition.

In the approach of adapting the work to the operator, each of these three issues is a test for the ergonomist's efforts to lessen the conflicts between tasks and activities[10] by increasing the scope for manoeuvre[11].

Company competitiveness demands translate into increased productivity and flexibility, which in turn result in new management styles:
- a core business focus and lean management;
- outsourcing;
- just-in-time and lean production;
- continuous activity monitoring, etc.

These techniques enable production to be fine-tuned, but also rely on reducing the scope for manoeuvre because, paradoxically, reduced market elasticity requires greater flexibility and shorter response times from manufacturing firms, which must be able to "surf" between product runs.

The organisational factors are having appropriately sized and formed workforces to handle the workload, monotony or variety of tasks, autonomy and decision-making, time pressure and emergencies, attention, training, working hours (predictability, consistency, balance between working time and rest periods), job satisfaction, job security, etc. The new work patterns are fixed-term contracts, temporary agency employment, part-time work (sometimes in multiple jobs), non-standard working hours, split shifts[12]. American economists from the University of Massachusetts[13] report a positive, statistically significant correlation between the use of just-in-time production and quality circles and MSD, with impact rates varying from 20 to 65% in the 1848 workplaces studied.

Where the demographic challenge posed by population ageing is concerned, I stressed the part played by work in developing workers' health. But, as can be seen from the Dublin Foundation's surveys[14]:
- 27% of the workers aged 50 to 59 are no longer working;
- 33% of the manual workers are no longer working[15];
- the health of 42% of the older workers has deteriorated to the point where they are unable to work;
- 75% of cases where workers were unfit for work are due to musculoskeletal system disorders.

These findings should give us all cause for concern, because joint problems have an unfortunate tendency to act through cumulative microtraumas which are very much present but have no discernible effect in young people. These cumulative effects will ultimately reach the pain threshold where the

[8] The SUMER study: www.eurofound.eu.int/ewco/surveys/FR0603SR01/FR0603SR01_5.htm. On the Sumer survey, see also article on p. 9.
InVSLoire study: www.invs.sante.fr/publications/2005/mcp_pays_loire/plaquette_mcp.pdf and www.invs.sante.fr/publications/2005/symposium_tms/resumes_tms.pdf.
[9] P. Askénazy, Santé au travail : l'impact des nouvelles formes de pénibilité, *Le Monde*, 19 février 2005 (www.lemonde.fr).
[10] Conflicts between prescribed work and real work as it is actually done (determined by imponderables, etc.).
[11] The worker's scope for manoeuvre in time, space, organisation, tool or assembly-line adjustment (instead of the human operator's pace being dictated by that of the machine).
[12] Two or three hours' work in the morning followed by several hours off and a return to work for two to three hours in the evening. Examples are industrial cleaning of schools and offices, or restaurants with morning and evening services.
[13] See: www.umass.edu/peri/pdfs/WP30.pdf.
[14] See footnote 8 *supra*.
[15] Meaning that they are over-represented in the preceding cohort.

Respondents' replies by sex and age group (%)

Problems	Men		Women	
	16-29	50-64	16-29	50-64
Very heavy physical work	30.5	16.6	28.5	18.0
Feels pain each week in:				
Upper back and neck	23.0	29.6	41.6	44.8
Lower back	23.1	27.8	36.0	34.6
Shoulders or arms	18.5	33.9	32.3	45.5
Wrists or hands	12.6	17.1	16.6	31.4
Hips, legs, knees or feet	18.2	28.8	29.2	40.4

Source: Arbetsmiljöundersökningen, 2005

perception of pain will be a much too belated symptom of already far-advanced damage[16]. The repetition of painful postures, motions and movements will over time bring on functional limitations which will ultimately lead to incapacity for work with its attendant problems.

In this respect, the preliminary statistical processing of the Swedish occupational health surveillance data 2005[17] is extremely telling when a read-across analysis is done of gender exposures and complaints in two age groups – men or women aged under 29, and men or women aged over 50 – who are gradually developing a functional limitation (see table).

It is noteworthy that:
- very strenuous physical work is more prevalent among young people, but conversely, the oldest workers suffer more pain (even though their workload generally tends to lighten);
- strenuous work is more marked among men;
- these pains are more prevalent among women;
- lower limb pains[18] are significant, especially among women.

Supporting young workers

The French SUMER survey pointed out the importance of biomechanical factors that some had claimed were on the way out thanks to the European VDU and manual handling regulations. Recent studies provide consistent, corroborating evidence that the new forms of work organisation are fundamental risk factors, and that job satisfaction plays a major role in the development of musculoskeletal system disorders.

This reinforces the field of intervention of ergonomics – like that of the other preventive health and safety disciplines – in the way it approaches risk situations which it is the job of all the disciplines and skills involved to control, not through risk management[19], but through "proactive prevention".

Young job entrants are a higher risk group than their elders, and the story of their health is yet to be told or made. The world of work, like that of business and technology, is changing rapidly, with new risks emerging, such that situations which were under control at one point may not be the next.

It falls to us, as prevention professionals, to stress the importance of that point and to support young people as participants in health and safety at work, and in being and staying healthy at and through work. This is a key role that involves creating awareness among the other participants: governments, employers, insurers and voluntary agencies. The trend towards deregulation does not help to construct the solid foundations on which to base a businesslike commitment to tackling the basic problems and new challenges in health and safety at work. Rather the reverse: that trend seems to imply that the prevention professional first has to show that what he is doing will save the company money and market share, and that injuries, physical health problems, unfitness for work, impaired mobility, loss of leisure time and even death in service can be prevented only if prevention costs "half of nothing".

Does this not suggest another challenge to be met: that of the specific "health and safety" characteristic of what we do, focused on workers' health and the relevance of what we do for it rather than the economy or a business strategy? ■

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[16] Carpal tunnel syndrome resulting from inappropriate movements or postures can develop over a period of eight years before manifesting through tingling sensations and pain that will often require surgery.
[17] See: www.av.se/dokument/statistik/officiell_stat/ARBMIL2005_prel.pdf.
[18] These pains and symptoms are seldom considered in MSD, which over-concentrate on the back and upper limbs, which is why I prefer to refer to work-related disorders of the musculoskeletal system.
[19] Which effectively turns the ergonomist into a manager accountable to the user of his skills for whether the risks incurred are there or not.