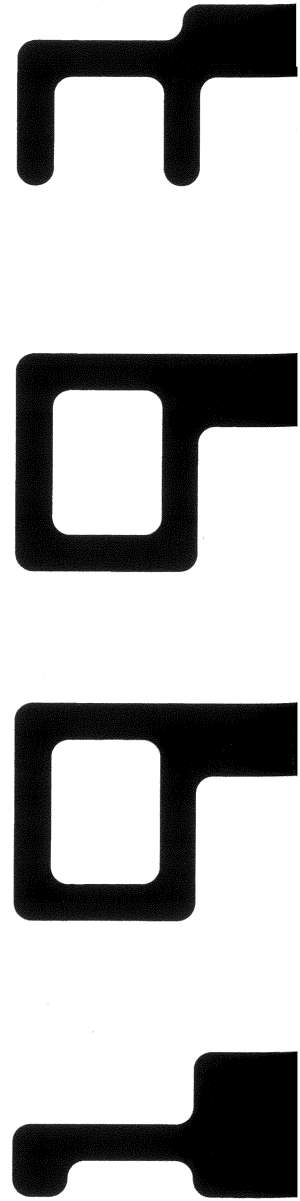


# IRSST Annual Report



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**Research, the key  
to understanding**

#### Missions and goals

The Institut de recherche en santé et en sécurité du travail du Québec (IRSST, Québec Occupational Health and Safety Research Institute) was created in 1980 and is funded by the Commission de la santé et de la sécurité du travail du Québec (CSST, Québec Occupational Health and Safety Board). The Institute seeks to contribute, through research, to the identification and elimination at source of occupational hazards, and to the rehabilitation of workers who have become victims of these hazards.

To fulfil its mission, the Institute:

- conducts and contracts researchs which responds to the needs of the working community;
- offers laboratory services and expertise to the Québec occupational health and safety prevention network;
- communicates the results of its research and consulting activities to the working community; and
- awards graduate scholarships.



#### **IRSST**

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Publications

In 1993, the Institute published 30 new research reports and technical guides and distributed close to 21,000 documents, either in response to requests or through special events such as symposiums, conferences and exhibitions.

The inaugural issue of the Newsletter, detailing recent Institute research and publications, was published in 1993. It is destined for research centres and occupational health and safety organizations in other countries.

The number of subscribers to the periodical L'IRSST rose by 15% last year, and now stands at more than 4,600. Articles appearing in 1993 covered such topics as the significance and variety of risks faced by garbage collectors (Spring), a participatory ergonomics endeavour aimed at preventing cumulative trauma disorders (Summer-Autumn) and the development of tools favouring the reintegration of hearing-impaired workers (Winter).

PRESIDENT'S MESSAGE

This Annual Report provides ample proof that research on occupational health and safety produces results. Research conducted at the Institut de recherche en santé et en sécurité du travail (Québec Occupational Health and Safety Research Institute) responds to specific needs of the working community: it provides workers and employers with information, tools and plans of action relevant to their prevention efforts, and promotes their autonomy in these endeavours. For example, a product developed to remedy a particular problem can often be adapted for use in other areas where people are faced with similar problems.

In order to fulfill its mandate, however, the Institute strives to do even more. To maximize its impact, it has given pride of place to a number of specific concerns. The great strides made this year in two areas—research into back problems and cumulative trauma disorders—attest to the soundness of this approach.

More than ever, the Institute is a key player in the occupational health and safety network, supplying workers, employers and specialists with the fruit of its research—research undertaken for the most part at the request of the working community. The Institute collaborates closely with the CSST and carries out research into new approaches the latter may recommend, in the areas of rehabilitation and return to work, for example.

In recent years, teaming up with the CSST on specific projects has proven to be most profitable for the Institute. Our goal now is to step up our efforts in this direction and Act. . . where it counts.

Pierre Shedleur,  
President

CHIEF EXECUTIVE OFFICER'S REPORT

Our dream of making research on occupational health and safety a partnership affair is now a reality. The close ties maintained by the Institut de recherche en santé et en sécurité du travail du Québec (Québec Occupational Health and Safety Research Institute) with the CSST, the working community and the occupational health and safety network have fostered both the sharing of research results and the increased participation of a great many partners in the research process itself.

Our collaboration with joint sector-based associations has blossomed in recent years as well, with the result that an increasing amount of research is now conducted in the field, with the cooperation of the working community. As this report shows, we are now in a position to achieve and publicize results not only for the working community but with its help. I am pleased to note that more and more of these results are being put to good use.

The Institute seeks a global strategy. We are tackling problems of an increasingly complex nature, and strive for a multi-faceted approach. At the same time, our goal has been to promote the emergence of a versatile group of scientists in the realm of occupational health and safety. Results from a survey of our scholarship recipients since 1981 indicate that our graduate studies bursary programme has been largely successful in this regard.

In closing, I would like to thank all those who have contributed to the progress of occupational health and safety research, and most especially Mr. Robert Diamant, for his many years of support as president of the Institute, a position he held until May 1993.

Jean Yves Savoie,  
Chief Executive Officer

HIGHLIGHTS

Research<sup>1</sup>

To ensure that its efforts reflect the preoccupations of the working community, the Institute has defined, in consultation with that community, the following fifteen research sectors:

- Back problems
- Cumulative trauma disorders
- Noise
- Chemical and biological contaminants
- Safety of tools, machines and industrial processes
- Vibration
- Work organization
- Protective equipment
- The accident process
- Evaluation of prevention activities
- Air quality in non-industrial buildings
- Occupational health and safety indicators
- Rehabilitation
- Risk-free pregnancy
- Sociological and technological change

During 1993, the Institute defined guiding principles and bases of action that will form the core of its research efforts in a number of these fields.

Back problems

A two-year follow-up study of more than 2,000 typical back-problem-related claims received by the CSST in 1988 was completed in 1993. It would appear that the initial diagnosis of a worker's condition is the best predictor of lost work time as well as the likelihood of eventual chronicity. Thanks to statistics such as these, a variety of prevention strategies can be developed.

The importance of research into back problems needs no longer be emphasized: in 1991, 29.3% of work-related injuries and illnesses declared to the CSST were back-related. By themselves, these disorders accounted for 44.9% of all sums paid out in compensation.

There are a number of difficulties associated with the prevention of back problems:

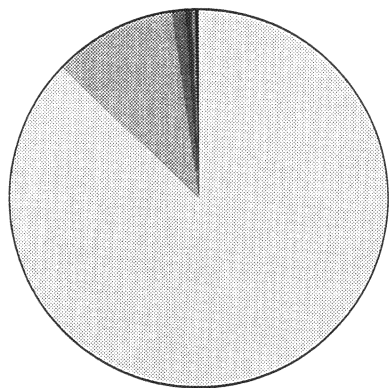
- The pathology is little understood; problems may originate in any number of anatomic structures located in the spine or the back as a whole.
- Current medical knowledge does not enable us to clearly specify risk factors, even though overall links between back problems and factors such as handling operations or vibration have been established.
- The study of the cause-and-effect relationship between work and back problems has proven to be complex because factors unrelated to work must also be taken into account.

Arriving at a better understanding of the risk factors involved means carrying out complex research. The Institute has decided to focus its efforts with regard to back problems on the prevention of chronicity and the promotion of prompt return to work.

Following the recommendations of the IRSST funded Groupe de travail québécois, headed by Dr. Walter Spitzer, in 1986, a number of projects have been completed which validate certain aspects of case management: the effectiveness of "back schools" (information on lumbar problems, physiotherapy and other methods of treatment that seek to cure the problem and prevent relapses), the contribution of thermography, triaxial dynamometry and spinoscopy to clinical diagnosis, and methods of evaluation used by multidisciplinary teams, in association with ergonomic procedures in the workplace, to promote occupational reintegration. The Institute will continue to support these evaluation studies, which enable identification of the most suitable case management protocols.

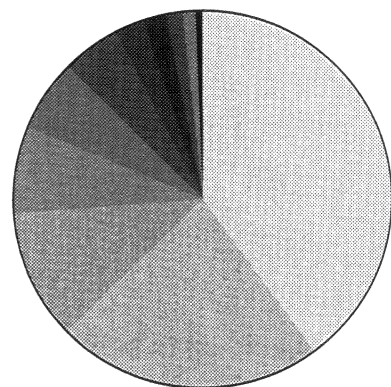
Funding

The IRSST's total revenue in 1993 was \$18,836,447, including a grant of \$16,437,208 from the CSST. Expenditures stood at \$18,147,777.



Revenue: \$18,836,447 = 100%

CSST	87.3%
Laboratory services	10.5%
External contracts	1.2%
Interest	0.6%
Municipal surtax refunds for 1992	0.3%
Miscellaneous revenue	0.1%



Expenditures: \$18,147,777 = 100%

Internal research	40.1%
External research	22.8%
Laboratory services	11.2%
Administration	7.4%
Scientific administration and coordination	6.1%
Communications	5.1%
Computer services	2.4%
Documentation centre	2.0%
External contracts	1.3%
Research applications transfer	1.1%
Relocation	0.5%

Research

Internal research teams and funded or contracted external research teams were involved in 125 research and consulting projects in 1993. Of these, 37 were begun, 47 were ongoing and 41 came to an end over the course of the year. A list and a summary of all the projects underway in 1993 is appended to the original French version of this report.

In 1993, the Institute allocated \$7,285,609 to its internal research programmes and \$3,594,797 to its external research programmes. This latter amount was distributed as follows:

- External research groups:	\$1,451,786
- Contract and funded research:	\$1,822,705
- Graduate scholarships:	\$ 320,306

Finally, as part of its graduate-studies bursary programme, the Institute awarded two postdoctoral fellowships, nine scholarships to doctoral students and another nine to masters' students working in high-priority research fields.

Laboratory services

In 1993, the Laboratory Division carried out some 49,000 environmental and toxicological analyses, and performed over 4,000 hours of services for the CSST's prevention network. An additional 2,000 analyses and 200 hours of service were performed as part of research projects.

Over 98% of the analyses were conducted for CLSCs and regional health boards, for the purpose of establishing health programmes for businesses in industries given high-priority status by the CSST.

Solvent analyses accounted for 47% of all analyses, with metals and ions accounting for 11%, dusts for 10%, toxicological analyses for 25% and miscellaneous analyses for 7%.

Besides performing over 225 types of analyses, the Laboratory Division calibrates, maintains and repairs equipment used by members of the prevention network to sample air contaminants as well as measure gas concentrations and physical parameters such as noise.

The Laboratory Division clientele is not limited to members of the prevention network, and in 1993 it provided services to employer groups, unions, companies and various other organizations.

<sup>1</sup>. A complete summary of all research undertaken in 1993 may be found in the

## ADMINISTRATIVE REPORT

### Organizational structure

The General Executive is responsible for the overall management of the Institute. This mandate includes the formulation and execution of policy, particularly that related to leadership, presentation, development and coordination of research in occupational health and safety in Québec, and communication of research results. The Secretariat assists the Chief Executive Officer and is responsible for ensuring that the meetings of the Institute's various decision-making and advisory committees run smoothly.

The Scientific Executive assists the Chief Executive Officer in the formulation and evaluation of the Institute's research activities. It is also responsible for maintaining links with the CSST, sector-based associations, the working community and other scientific organizations, and for scientific documentation.

The External Research Directorate is responsible for the IRSST's relations with universities and other competent research organizations that perform research in fields it judges to be relevant and of high priority. It also manages the funded and contract research programmes and the graduate scholarship programme.

The Laboratory Division is responsible for the administration and scientific management of the Analytical Support, Industrial Hygiene and Toxicology, and Safety Engineering programmes. All three programmes are mandated to provide laboratory and consulting services, and to perform research and development. The External Users Liaison Group manages requests for laboratory and consulting services, most of which come from CSST inspectors and hygienists from the Centres locaux de services communautaires (CLSCs, local community-service centres), regional health commissions and joint sector-based health and safety associations.

Research in the Safety Engineering Programme is aimed at reducing or eliminating hazards, especially in the fields of industrial machines, protective equipment, and noise and vibration.

The Industrial Hygiene and Toxicology Programme carries out environmental and toxicological analyses, provides the CSST and the rest of its occupational health and safety prevention network with the necessary expertise in this field, and also conducts applied research in industrial hygiene and toxicology.

The Analytical Support Programme conducts research and development in industrial hygiene, provides expertise in this field and maintains, repairs and calibrates all the industrial hygiene equipment used by the CSST and its prevention network.

The Work Organization Programme performs research that examines the impact of social, organizational and human factors on health and safety, develops new statistical indicators, applies data found in other databases, develops generally applicable models, and performs prospective analyses.

The Safety Ergonomics Programme conducts applied ergonomic research aimed at reducing occupational accidents and diseases. The primary research focus is on workstation analysis and design, and on risk factors for cumulative trauma disorders.

The Research Applications Transfer Unit develops expertise related to the application of research results, supports efforts by research teams to apply their results, develops strategies favouring the application of results of Institute research, and collaborates in their application. It also markets processes and products developed or funded by Institute research.

The Communications Division is responsible for the dissemination of information about the Institute, its priorities, orientations, research and other activities. It prepares institutional publications, publishes research findings and communicates with the media. It offers advice to other divisions and programmes on communications issues.

The Administrative Services Division is responsible for human, financial and material resources, and labour relations.

The Computer Services Division is responsible for the development and management of the Institute's information systems.

### Personnel

The Institute is blessed with a stable work force. Roughly 40% of employees have been with the IRSST for more than ten years.

Employee training is one of the Institute's priorities: employees took 158 training and upgrading courses in 1993. Furthermore, the Institute revised the content of its fringe benefits plan over the course of the year, in accordance with the recommendations of an internal advisory committee.

Research aimed at facilitating early intervention by working communities themselves was also supported by the Institute. An excellent example has been the participatory ergonomics study undertaken at the Société des alcools du Québec (SAQ, Québec Liquor Board) which examined the links between handling operations and back problems among warehouse workers.

Research suggests that a rapid return to regular work routines after a back injury is most beneficial, provided that the proper modifications have been made to the work environment. The Institute has made return to work one of its research priorities, in the hopes of setting up projects involving the modification of workstations, the establishment of individual work/rest schedules or the early detection of possible chronicity, all with a view to helping individuals maintain their employment.

#### Cumulative trauma disorders

A project carried out in an electrical transformer factory and in a household appliance factory helped perfect a workstation-analysis tool designed specifically to prevent CTDs. The tool is designed for use in a participatory ergonomics context by bipartite groups who have minimal ergonomics training.

Interest in cumulative trauma disorders (CTDs) is a relatively recent, but rapidly growing phenomenon. In 1960, there were no more than 10 scientific articles on the subject worldwide; today more than 300 are published every year.

Despite this recent boom in research, many pressing requests from various sectors still go unanswered. The Institute's response to this situation has been to concentrate its efforts in two key areas:

- consolidation of existing scientific data
- making the best possible use of available knowledge in determining what workplace interventions are most appropriate

The initial stage of the Institute's strategy was to form an international committee of experts. The committee reviews the body of scientific literature relating to CTDs, isolating and analysing those elements deemed useful for the development of prevention plans. A preliminary report tabled by the committee in 1993 sets out the salient facts concerning the relationships between various types of CTDs and work environments. It also identifies factors likely to aid prevention. The final version of this report will be published and widely distributed in 1994.

As a second step, the Institute took concrete preventive action in a number of settings, including pork and poultry slaughterhouses, poultry processing plants and electrical appliance factories. These actions pinpoint factory and assembly line design as key elements in the CTD prevention effort, and also address corrective measures already instituted in these settings.

In the coming year, the Institute hopes to take action on a number of fronts, by:

- collaborating on the production of practical guides, based on the international committee's literature review, used in various work settings and by the CSST
- generalizing findings from sectors already studied
- applying existing strategies to other, heretofore unexplored areas, as well as to smaller firms
- working toward a more complete understanding of the causal mechanisms of CTDs

Finally, the Institute is preparing to host PREMUS 95, the 2nd International Conference on the Prevention of Work-related Musculoskeletal Disorders, a major event that will enable scientists to take stock of current efforts at prevention and exchange information with practitioners in the working community.

#### Safety of industrial tools, machines and processes

Interviews with forestry workers, an inventory of machines and analyses of accident data make it possible for Institute scientists to pinpoint design problems with equipment such as fellers, skidders and delimbing machines, and to make short-, medium- and long-term recommendations toward reducing the risks associated with them.

Restructuring efforts have recently been applied in the field of the safety of industrial tools, machines and processes with a view to defining a general framework and determining specific areas of action. Two main strategies emerge:

- improving know-how on the integration of occupational health and safety concepts into the design of tools, machinery and processes
- imparting this know-how to present and future designers

The first strategy calls for joint efforts by engineers, designers and experts in industrial processes and work organization. With this in mind, the Institute has instituted a partnership with researchers at the Université de Sherbrooke and the Centre de recherche industrielle du Québec (CRIQ, Québec industrial research centre), leading to the establishment of joint projects.

In recent years, the Institute has sought to correct safety defects in machinery, chiefly in the areas of forestry, sawmills, metal products manufacturing, and construction. Institute initiatives have made it possible to reduce the risks of accidents posed by equipment such as edging machines, splitters and chipper-shredders, while consolidating knowledge about tool, machine and process safety.

In addition, the Institute is facilitating projects designed to incorporate the notions of occupational health and safety into the design of tools, machines and processes, based on the concept of "simultaneous engineering." Institute ergonomists are at work developing methodologies to achieve these types of integration.

For its second course of action, the Institute is relying on partnership projects aimed at raising awareness of the importance of occupational health and safety on the part of designers and engineers. It is clear, however, that efforts must be channelled into:

- the publication of methods found to be effective in the course of these projects
- the training of new engineers and designers
- continued training for engineers and designers already on the job

#### Noise

The Groupe d'acoustique et de vibrations de l'Université de Sherbrooke has begun work on a project designed to supply Québec industry with simple, modern tools for predictive acoustics. These tools will enable firms to proceed, with full knowledge of the facts, to acoustically treat their premises, or, even more importantly, enable them to integrate acoustic concerns into the plant design process.

Up to the present, the Institute's research on industrial noise has focussed on four major aspects of the problem:

- At the Institute itself, work of a technical nature has been done

on the measurement of impact noise.

- Members of the Groupe d'acoustique et de vibrations de l'Université de Sherbrooke (GAUS, acoustics and vibration group) are working to reduce industrial machine noise, incorporating their understanding of why these machines are so noisy into practical solutions to the problem of noise reduction in a variety of factory settings.

- The same team is also engaged in predictive acoustics, and has perfected or validated various software tools that make it possible to predict acoustic performance in industrial installations.
- Finally, researchers at the Université de Montréal, in collaboration with a private consulting firm, are studying acoustic signalling and its perception, in industrial facilities (acoustic warning alarms) as well as on vehicles (backup signals).

#### The accident process

A study designed to determine optimum acoustic characteristics for backup signals used on heavy vehicles enabled the development and validation of a method by which it will soon be possible to identify currently available alarms that do not meet minimum safety requirements.

The vast majority of injuries involving compensation by the CSST are accident-related; hence the crucial importance of understanding exactly how accidents occur. With this in mind, research on how to prevent work acci-

dents has focussed on a number of areas in recent years:

- using statistics to determine the frequency and seriousness of accidents
- identifying groups of workers at risk
- conducting field studies on accident causes
- developing preventive measures at the technical and work organization levels

The Institute has conducted and continues to conduct a great deal of work in the following areas: range-limiting devices for mobile cranes; analyses of accident data collected on hospital personnel; causes of accidents in the construction industry; and analyses of factors explaining the rate and seriousness of road accidents involving professional drivers.

Research can contribute to accident reduction by solidifying the scientific basis of preventive measures. In particular, it is important to determine the nature and relative significance of accident causes, which may be investigated from different viewpoints:

- the overall perspective, which involves laws and regulations as well as the socio-economic aspects of various industries
- the organizational perspective, which covers a firm's management and production practices
- the operational perspective, which encompasses work activities and conditions
- the individual perspective, which considers the physiological, cognitive and psychological characteristics of workers

#### Special events

- In March 1993, Montréal hosted a symposium entitled "Surveillance biologique de l'exposition des travailleurs" (Biological monitoring of worker exposure), jointly organized by the Association des médecins du réseau public en santé au travail du Québec (AMRP-STQ, Québec association of public occupational health physicians), the Association des médecins du travail du Québec (AMTQ, Québec occupational physicians association), the Université de Montréal industrial toxicology group and the IRSST. The symposium brought together nearly 150 physicians, nurses, hygienists and students involved in occupational health and safety.

- At a May 1993 press conference in Jonquière, the Institute, in collaboration with Alcan Smelters and Chemicals, the Fédération des syndicats du secteur aluminium (the Québec aluminum-sector labour association) and McGill University, presented results of an epidemiological study on the risks of lung cancer among workers at a smelter in Arvida as well as an update of an earlier investigation which examined the incidence of bladder cancer. The study was begun in 1990, and the Institute presided over the project co-ordinating committee.

- In May of last year, the Institute hosted the annual meeting of the International Group of Directors of Occupational Health and Safety Research Institutes. In addition to the IRSST, twelve organizations from Australia, England, Finland, France, Germany, Norway, the Netherlands, Poland, Spain and Sweden were represented. The directors acknowledged the need to coordinate efforts that would facilitate the sharing of information, including research results and data from research currently in progress. They also emphasized the importance of transferring research findings to the work communities likely to make use of them.

- In October 1993, as part of both the Quinzaine des sciences and Occupational Health and Safety Week, the IRSST organized a symposium entitled "Manutention et maux de dos" (Handling Operations and Back Problems), attended by 190 people, including occupational health and safety administrators and professionals, members of health and safety committees, teachers, students, engineers and ergonomists.

- Also in October, the Institute paid tribute to the twenty recipients of graduate studies bursaries awarded during fiscal 1993-94. Since the inception of its graduate scholarship programme in 1981, the Institut has assisted 202 graduate students, more than 90% of whom are now active in the job market—two-thirds of these in occupational health and safety, whether in research, teaching, in the field or in administrative positions.

- Finally, as they do every year, Institute scientists and researchers were invited to address a number of symposiums organized by the CSST and the working community.



## Technology transfer and publication of results

In 1993, the Institute kept up its efforts in highlighting the products and results of Institute research.

A marketing agreement was negotiated for the software program OPAL (outil pour l'aménagement de locaux, or storage space layout tool), which provides regulations and standards applicable to premises housing dangerous materials; the program is now commercially available.

A research and development agreement was concluded for the protective breathing system, currently being developed by the Industrial Hygiene and Toxicology Programme, which eliminates the isocyanates that cause occupational asthma. A marketing agreement is being finalized.

Negotiations began in 1993 for the marketing of two other products: a system for sampling isocyanates in breathing zones and a gravimetric cell, developed by the Safety Engineering Programme, which will enable companies to carry out their own resistance tests on protective gloves used with volatile chemicals. Moreover, Institute representatives, in collaboration with the École Polytechnique, have been continuing their promotion of a software program for use in the reinforced plastics industry that facilitates conversion to resin-transfer moulding (RTM) techniques. Such techniques significantly reduce the styrene emissions usually associated with this type of operation. Firms interested in testing the mould manufacturing software have been approached.

Research on the collection of household waste gave rise to a number of activities involving Institute partners in the transfer of knowledge and the communication of results to policy-makers and working communities.

A specification sheet was produced for the anti-kick-back device for unplanned-wood edgers and gang resaws, developed by the Safety Engineering Programme. Institute representatives also collaborated with the Association de santé et de sécurité des industries de la forêt du Québec (ASSIFQ, Québec forestry industry health and safety association) on a campaign to raise awareness in those establishments likely to benefit from implementation of such a system.

## Consulting

The expertise acquired by Institute scientists in carrying out their research makes them highly qualified as consultants, much sought after by partners who wish to profit from such knowledge in the context of their prevention and training activities. This expertise is particularly renowned in occupational health and safety areas such as falls from high places, electrical and magnetic fields, protective equipment testing and ventilation testing.

In the realm of personal fall-arrest systems, a team from the Safety Engineering Programme gave a course at the École Polytechnique's Department of Continuing Education. Institute scientists also responded to consultation requests in this area from Hydro-Québec and Médiacom. For Hydro-Québec, they conducted a review of work methods inside the corporation's generation facilities, a review that may affect some 2,000 workers. For Médiacom, they validated an analysis of risks associated with work on billboards and posters, suggested design criteria for protective equipment and developed a testing protocol at the École Polytechnique's structural laboratory.

Research by Institute personnel into electrical and magnetic fields involved mainly the telecommunications, heavy industry and machinery sectors.

In the field of industrial hygiene, researchers developed performance tests whose widely published results led to the replacement of a number of direct-reading instruments in extensive use throughout Québec.

Furthermore, the Institute conducted testing on boots and leg protectors worn by forestry workers, as part of the certification process for application of Canadian standards, and tested new products under development.

Finally, 1993 saw the completion and publication of a specification sheet on ventilation for snowmobile repair workshops. The specification sheet, produced in response to a request from the CSST, which guaranteed it wide distribution, provides the proprietors of some 400 snowmobile repair shops in Québec with the information necessary to install an effective, easily maintained and affordable mechanism for capturing exhaust fumes.

## Rehabilitation

An initial exploratory study on the reintegration of workers in rehabilitation, completed this year, revealed, among other things, how the work setting as well as the context of intervention affect the outcome of occupational reintegration. The study's recommendations concerning the progress of research in this relatively new field should lead to greater understanding of this complex phenomenon.

In Québec in 1991, some 10,000 workers made use of the CSST's rehabilitation programme. For many such workers, returning to their old job after an injury proves difficult. They therefore require different kinds of support in their efforts to maintain their employment and find a position suited to their abilities.

Since its inception, the Institute has been explicitly entrusted with the task of contributing, through research, to the rehabilitation and professional reintegration of workers affected by accidents or work-related illnesses. The Institute began tackling this aspect of its mission by studying, among other things, ways to rehabilitate workers suffering from back injuries or hearing loss.

In this area, the Institute has funded work designed to perfect a clinical procedure for measuring workers' ability to detect acoustic warning signals, and on the use of hearing aids to help reintegrate deaf workers. The results of this research opened up new avenues for the reintegration of individuals with hearing loss into noisy work environments.

Over and above specific studies focussing on different types of injuries or deficiencies, the Institute has striven to offset a lack of general knowledge about reintegration, and has oriented its efforts vis-à-vis return to work along three major axes:

- forms and methods of reintegration, and related statistics
- factors favouring return to work
- workers' progress and motivation

An exploratory study completed in 1993 shed some light on several of these subjects. Among other findings, the study highlighted the important role the maintenance of employment plays in the success of rehabilitation efforts, as well as the difficulties involved.

The study further recommends the following research perspectives:

- statistical profiles on the return to work of workers undergoing rehabilitation
- a study of the conditions necessary for success, and the problems encountered by the different parties involved
- identification of factors favouring a rapid return to work and the maintenance of employment
- a study of medical practices and procedures used to determine functional limitations
- a study of approaches to the assessment and development of residual functional capabilities
- a study of actual rehabilitation experiences, undertaken in specific target sectors or focussing on certain types of injuries
- the psychosocial dynamics of rehabilitation, specifically, boosting worker motivation

## Risk-free pregnancy

The For a Safe Maternity Experience task force report confirmed the significance of ergonomic hazards as the cause of 70% of preventive reassignment cases. It also revealed a direct link between requests for preventive reassignment and increased rates of work activity undertaken by women of childbearing age, and highlighted regional disparities in the rate of reassignment requests. All these findings point to avenues for further research.

In Québec, women of child-bearing age make up an increasing part of the work force. In the past 30 years, the proportion of women between the ages of 25 and 34 holding a job outside the home has grown from 27% to 75%. Efforts at keeping

pregnant women on the job in conditions deemed not to be dangerous for their health or pregnancy led to the creation of the preventive reassignment programme for pregnant or breast-feeding workers, administered by the CSST.

The implementation of this programme has, however, posed certain difficulties, due chiefly to the meagre scientific data available on dangers in the workplace. The CSST has therefore formally requested that the Institute examine the potential contributions of research toward better implementation of this programme. By way of response, the Institute set up a task force, presided over by Dr. Madeleine Blanchet and made up of researchers as well as representatives from universities, regional health commissions, management and labour, and entrusted to it the mandate to conduct an assessment of the situation and identify research needs.

As a follow-up to the task force report, the Institute proposed two broad areas of research:

- the identification of hazardous ergonomic stressors
- aid to the decision-making process in the context of the preventive reassignment programme, achieved through study of consensus and dissenting opinions, and case studies, among others

Focussing on these areas has led to the formulation, by Institute as well as external researchers, of a number of proposals, which will be studied in 1994.

#### Chemical and biological contaminants

Measurements of isocyanate concentrations in 15 automobile paint booths, analysed in tandem with the characteristics of the booths themselves, made it possible to establish configuration parameters for booths and ventilation systems, the optimum position for the vehicle being painted, the composition of the paint itself, and standards for maintenance of ventilation system components—all measures that reduce painters' exposure to isocyanates to a minimum.

Chemical and biological contaminants remain a cause for concern in the workplace.

At the Institute as elsewhere, this field has been the object of numerous studies, which have helped to establish exposure

norms. A methodology has also been developed in the area of industrial hygiene, to identify dangerous workplace contaminants, and control and measure exposure levels. The Institute has taken an approach that favours the elimination of contaminants at source, and has geared its research efforts along the following lines:

- consolidation of findings on pneumoconioses, occupational asthma, neurotoxic effects and dermatoses
- development of new skills for dealing with emerging problems, particularly in the agricultural and industrial-waste-processing sectors
- precise studies aimed at the source reduction and control of exposure to known toxic agents
- methodological developments for support and reference activities

#### Protective equipment

The Institute has developed a widely recognized expertise in the area of protective equipment. Personal fall-arrest systems, protective equipment for forestry workers and protective breathing apparatuses were among the specific areas addressed in 1993.

Institute researchers again laid particular emphasis on guardrails and horizontal lifelines. They responded to numerous requests from the CSST, the health and safety network and businesses, and took part in work on standardization.

In the realm of protective breathing apparatuses, various projects were finalized in 1993, including studies geared toward predicting the service life of filter cartridges in cases of exposure to a mixture of two contaminants. Finally, work is in progress on a new protective breathing system that will lead to the elimination of isocyanates.

#### Occupational health and safety indices

For a number of years now, the Institute has drawn up provincial, sectoral and sub-sectoral statistical profiles of the frequency and seriousness of occupational injuries and diseases. Two projects of this type were completed in 1993. One uses compensation statistics from the CSST, and the other relies on data obtained from a Santé Québec survey.

As well, the Institute and the CSST took part in work conducted by the Canadian Standards Association (CSA) toward defining the types of data that should be collected about the circumstances leading to accidents. Availability of such information would facilitate studies on accident causes and in turn be a valuable asset for prevention.

#### Work organization

With work organization gradually becoming recognized as a determining factor in occupational health and safety, companies are instituting major changes in this area. Up to now, the Institute has conducted its research along two major lines:

- identification of risk factors associated with certain forms or components of work organization
- study of the characteristics of work organization that facilitate prevention and professional reintegration programmes

By way of example, a study of the links between safety assessments and certain characteristics of work organization and management in underground metal mines in northwestern Québec was completed in 1993. A second study, dealing with management strategies that favour the involvement of supervisors in occupational health and safety, was also completed over the course of the year.

#### Evaluation of prevention activities

The world of research into health and safety in the workplace, still in its infancy, shows that prevention efforts can often rest on shaky scientific foundations. The authorities who apply preventive programmes, among them the joint sector-based associations, have expressed the desire to see some of them evaluated.

Consequently, the Institute recently issued, in concert with the Fonds pour la formation de chercheurs et l'aide à la recherche (FCAR, Québec researcher training and research support fund), a call for tenders aimed at initiating projects that will study the accident process and assess prevention strategies. Approximately ten projects of this type are under way, several of which deal with the effectiveness of training in occupational health and safety, especially in the mining and manufacturing sectors.

#### Air quality in non-industrial buildings

The Institute is regularly called upon to respond to a multitude of queries relating to air quality in non-industrial buildings, and is preparing to renew its research efforts in this area along two clearly defined axes:

- assessment of ambient air, with particular emphasis on microbial contamination, and including sampling strategies, measurement methods and the obtaining of reference data to interpret the measurement results
- architectural layout, which encompasses the design and operation of ventilation systems, the layout of premises and air distribution

#### Vibration

In the past several years, the Institute has supported projects of a technical or analytical nature in the field of vibration, with the aim of reducing exposure and ensuring that standards are respected.

In 1993, a study on the vibration produced by rivet guns in aerospace assembly was completed; information derived from this research is currently being transferred to various settings that use the riveting process (aerospace, transport equipment) and also to manufacturers of riveting equipment.

Other studies under way include an investigation of heavy-vehicle suspension, which is a major generator of whole-body vibration. Increased involvement on the part of manufacturers would improve application of the results of research in this area.

#### Sociological and technological change

The study of sociological and technological change seeks to predict the occupational health and safety problems that could eventually result from such change. Since these problems vary from country to country, it is imperative that research be undertaken locally.

While the Institute up to now has been relatively inactive in this area, it will attempt to establish research guidelines pertaining to:

- the impact of new technology on occupational health and safety
- the management of technological change
- the aging workforce