Foresight through Knowledge

\[ \frac{W}{W_0} = \exp \left[ -\frac{k}{\beta^2} R^2 T^2 \ln \left( \frac{P^*}{P} \right) \right] \]
As president and CEO of the Institut de recherche Robert-Sauvé en santé et en santé du travail (IRSST), I am responsible for the information contained in this activity report. I hereby attest to its accuracy and the reliability of the controls carried out.

Recommended by the IRSST’s Scientific Advisory Board and approved by its Board of Directors, this 2009 activity report faithfully describes the Institute’s mission, vision, and main achievements. It presents the indicators used to assess production and provides accurate and reliable data on the results obtained.

I therefore declare that I have every reason to believe that the observable facts and measurable data presented in this activity report correspond to the situation as at December 31, 2009.

Marie Larue
President and CEO
IRSST
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The Face of Tomorrow Here

In Québec, demographic indicators, employment injury statistics, socio-economic changes, and data on the work environment are all used to define scenarios that foreshadow some of the transformations likely to be witnessed in the workplace in the years ahead.

First, demographic forecasts indicate that the aging of the workforce could intensify faster in Québec than elsewhere in Canada. This raises a number of issues, and points to possible research avenues, while confirming the timeliness of the research projects defined by the Institute in its Work Context and OHS field. Not only is the workforce aging, but its composition is diversifying with the increasing numbers of migrant and immigrant workers. Their growing presence could have an impact on OHS training needs.

Looking ahead, the preservation of workers’ mental health will occupy a bigger place than ever on the agenda of the working world. Mental health injuries are becoming a major concern for both public and private insurers, which see them as one of the leading causes of disability. The mental health issue in no way overshadows the other prevention challenges, such as primary prevention of occupational cancers, the specific needs of small and medium-sized enterprises (SMEs) in the area of OHS management, or the integration of comprehensive prevention strategies as opposed to resorting to “risk-by-risk” or “case-by-case” approaches.

The IRSST’s laboratories will have to be constantly poised to respond to their clients’ new needs, while continuing to offer the prevention-inspection network the analysis and expertise services it requires.

Furthermore, although three out of every four workers in Québec are employed in the service sector, the physical constraints of work persist. These constraints have a clear impact on musculoskeletal disorders (MSDs), which are costly in both human and financial terms. Despite all the headway being made through research, energy must still be focused on the etiology of MSDs, workplace interventions, the follow-up of affected workers, and their occupational rehabilitation.
Attuned to Our Partners

In keeping with its mission, the IRSST contributes, through research, to both occupational injury prevention and worker rehabilitation. However, research alone is not a panacea for all ills. In order for knowledge to be translated into concrete results and applied in the workplace, the partners who act as intermediaries must assimilate this new knowledge, which was developed with their input and ultimately for their use.

To promote worker and employer involvement, the IRSST calls upon follow-up committees comprising members from workplaces, the prevention-inspection network, employer associations, labour organizations, and professional associations. These committees are active during all phases of the research cycle, including that of knowledge transfer. The Institute is equally rigorous with regard to the quality of the research projects and the results obtained, and therefore submits all results to peer review.

Being attuned to our partners by giving them the opportunity to express their needs and opinions during projects is the surest guarantee that our projects will truly address their needs. The IRSST thus seeks to maximize the likelihood that the results will be put to use and positively influence the occupational injury toll. The IRSST has been conducting and funding research for nearly 30 years to ensure that this knowledge contributes to the prevention of occupational accidents, injuries, and diseases.

That is our mission, and judging from the evidence, we are right on track.

Marie Larue
Research

- 175 projects and activities were active
  - 45 projects began (20 joint, 16 external, 9 internal)
  - 39 projects were completed
  - 91 projects were in progress
- 51 projects were being developed
- 138 partner organizations in the network were involved in active projects
- 109 new requests for expertise were received
- 64 committees included at least one IRSST representative
  - 21 committees of the CSST and its network, including regulatory committees
  - 16 national and international standards committees
  - 27 other local, national, and international committees
- 48 scholarships were awarded, for a total of $434,525

Dissemination

- 49 publications, including
  - 34 research reports, technical fact sheets, and guides published by the IRSST
  - 8 technical fact sheets and guides published in collaboration with partners
  - 7 laboratory methods
- 156 scientific publications (peer-reviewed) related to projects carried out or funded by the IRSST:
  - 63 journal articles
  - 83 articles published in conference proceedings
  - 10 other publications, such as book chapters, master’s theses, and doctoral dissertations
- 22 other presentations given by IRSST personnel or IRSST-funded researchers at scientific conferences or events organized by partners
- 29 popularized articles in Prévention au travail, the magazine published by the CSST and IRSST

1 Summaries of all the projects funded or carried out by the IRSST and a complete list of all scholarship recipients are available on its Web site at www.irsst.qc.ca.
Laboratory Services and Expertise

Environmental, toxicological, and microbiological analyses were performed, 81% of which were for our partners in the prevention-inspection network: the CSST, local health and social services network development agencies, and joint sector-based associations.

Hours were devoted to the calibration, maintenance, and repair of direct-reading and sampling instruments, with 82% of these hours dedicated to the prevention-inspection network; this 15% increase in the total number of hours compared to 2008 is mainly attributable to the implementation of new ISO-prescribed sampling methods.

Publications distributed in response to requests, downloads of research reports from the IRSST’s Web site, visits to the Institute’s Web site, subscribers periodically received news regarding the IRSST’s laboratory activities, new research projects, and the latest publications, via the electronic newsletter Info IRSST, prepared by the Communications Division.
Evaluation is one of the responsibilities that falls under the Strategic Watch and Quality Management Department, which meets this responsibility through the rigorous application of scientific criteria and taking into account the many schools of disciplinary thought. The process is long and involves several steps. The Department therefore analyzes the documents pertaining to all projects submitted for evaluation during the year; recruits qualified reviewers; studies and forwards the evaluations to the authors; examines the authors’ responses to the reviewers’ comments and analyzes the revised document; and prepares a synopsis used by the Scientific Advisory Board as the basis for recommending the project’s continuation or not, or for recommending the publication of a final report.

In 2009, some 60 reviewers, usually three per project, assessed the protocols for new IRSST research projects prior to start-up. The same number of reviewers was required to ascertain the quality of the project results before the Institute authorized their publication.

The IRSST is generally supported by over 130 reviewers from around the world, with half coming from Europe, slightly over one-third from Québec, 15% from the rest of Canada, and the remainder from a number of other countries.
Ensuring Usefulness

Comprising researchers, OHS professionals, and representatives of workplaces and professional associations, the follow-up committees are charged first with ensuring the relevance of carrying out a given research project, validating workplaces’ interest in participating, and identifying which workplaces are most likely to benefit from the results. The committee members then support the researchers throughout the project. Not only do they assist the scientists in solving problems that can arise in the field, but they also ensure that the results obtained are useful and usable, and help the workplaces concerned assimilate the results. In addition, committee members may participate in the evaluation of concrete OHS spin-offs derived from the results.

The data compiled by the Knowledge Transfer and Partner Relations Department indicate that three-quarters of the active projects in 2009 had a follow-up committee made up of individuals with field or scientific expertise. In other words, nearly 300 people with field or scientific expertise from 138 organizations sat on these committees. This practice, which is specific to the IRSST, facilitates research projects, guarantees project relevance, and promotes knowledge transfer and partner relations with the workplace community.

Reality-Based

It is not only the quality of the projects and results that is important. They must also meet partners’ needs and reflect workplace realities. To ensure a good fit between needs and the scope of the research projects, the IRSST forms follow-up committees even before the projects begin.

138 organizations involved in the follow-up committees

- 34% Public organizations – mainly ministries, sector-based committees, health services, educational establishments
- 22% Private enterprises
- 12% OHS professionals
- 11% Labour organizations
- 8% Universities and research centres
- 7% Employer associations
- 5% Professional orders and associations
- 1% IRSST
Among the highlights of 2009, the IRSST made the scientific information documented by its Strategic Watch and Quality Management Department accessible in blog form. Culled through the daily monitoring of over 650 OHS-related Web pages and of the information collected by its personnel, the blog content is selected on the basis of the scientific interest and pertinence of the information it provides.

Knowledge Mapping

In 2009, the Occupational Rehabilitation research field carried out its own mapping process to highlight “who was doing what” in this area. This mapping provided an overview of rehabilitation research in nine leading research centres around the world. It involved documenting over 200 research projects carried out between 2002 and 2008, for the purpose of determining the importance of occupational rehabilitation work for each institute and the type of research underway.

The first observation made was that Canada invests more in research on this theme than do other countries. The IRSST alone conducts approximately 20% of the projects carried out by these research centres. Moreover, nearly half of the 200 projects documented focus on musculoskeletal disorders (MSDs), but few studies deal with the lower limbs, specifically, the knee, as an injury site responsible for disability. This mapping of research in the occupational rehabilitation field revealed that the work focuses mainly on the determinants of long-term disability.

The Strategic Watch and Quality Management Department produced situational assessments of several topics of interest:

- road accidents;
- OHS integration into design processes;
- manual load handling and MSDs;
- wood dust;
- silica;
- intervention methods for cases involving low back pain and cervicodynia (neck pain) in the return-to-work context.
Every year, the IRSST develops new projects and activities, while completing others that culminate in the publication of reports, guides, technical fact sheets, and analytical methods.

Work was initiated on 45 new projects during 2009. These projects and publications, which are the output of IRSST personnel, funded researchers, and collaborative teams of internal and external scientific personnel, are essentially divided up into the IRSST’s seven priority research fields. Thematic programs are also designed by the research field personnel. One such program focusing on occupational asthma was added to the 30 or so existing programs, while two other new programs were being developed on bioaerosols and MSDs associated with office automation.

### The Most Frequently Downloaded 2009 Publications

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guide pour une démarche stratégique de prévention des problèmes de santé psychologique au travail</td>
<td>Jean-Pierre Brun et al.</td>
<td>French</td>
</tr>
<tr>
<td>Maux de dos – Évaluation de la spécificité de différents exercices d’endurance des muscles para-vertébraux</td>
<td>Christian Larivière et al.</td>
<td>French</td>
</tr>
<tr>
<td>Substances chimiques et effets sur l’audition – Revue de littérature</td>
<td>Adolf Vyskocil et al.</td>
<td>French</td>
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<tr>
<td>Chariots élévateurs – Étude ergonomique et analyse des stratégies de conduite des caristes</td>
<td>Steve Vezeau et al.</td>
<td>French</td>
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<tr>
<td>Relation entre la teneur en amiante dans les matériaux et la concentration de fibres dans l’air ambiant lors de travaux de déménagement</td>
<td>André Dufresne et al.</td>
<td>French</td>
</tr>
<tr>
<td>Comparaison de deux modèles biomécaniques articulaires dans l’évaluation du chargement lombaire</td>
<td>André Plamondon et al.</td>
<td>French</td>
</tr>
<tr>
<td>Verifying the content of lockout programs</td>
<td>Damien Burlet-Vienney et al.</td>
<td>French</td>
</tr>
<tr>
<td>Développement d’un outil d’aide à la conception acoustique d’encoffrements de machines</td>
<td>Franck Sgard et al.</td>
<td>French</td>
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Knowledge by Research Field

Noise and Vibration
1. Evaluation of the whole-body vibration exposure of soil compactor operators
2. Evaluation of the apparent mass of human subjects in a sitting position on actual seats
3. Infrastructures in acoustics
4. Development of a system for acoustical interference mapping and transfer to the workplace
5. Development of tools and methods for better evaluating and improving workers’ personal hearing protection
6. Evaluation of broadband backup alarms

Protective Equipment
1. Optimization of the tool for calculating the service life of organic vapour respirator cartridges

Occupational Rehabilitation
1. REPAR-IRSST Program: Evaluation of the effects of a postural training program on the neck-shoulder biomechanics of a group of MSD professionals
2. REPAR-IRSST Program: Evaluation of the intra- and inter-evaluator reliability of ultrasound measurements of the deep muscles of the trunk in healthy and chronic low back pain subjects
3. The factors affecting the return to work of people suffering from depression: union representatives’ component
4. Biomechanical assessment of lumbar stability determinants: an exploratory study
5. Pain and work status: a retrospective cohort study
6. Development of radiological indices for predicting the chronicity of work-related shoulder problems
7. Development of a guide for evaluating the margin of manoeuvre in a work situation for clients with prolonged disability of a musculoskeletal origin
8. Pilot project for the development of a sentinel process allowing for a shift from an individual-based rehabilitation approach to an organizational approach to preventing mental health problems in the workplace
9. Analysis of a post-traumatic intervention protocol and of management measures associated with the Centre jeunesse de Montréal-Institut universitaire

In addition to ongoing projects, approximately 40 new projects were approved in 2009.
Musculoskeletal Disorders
1. Review of knowledge on the design, use, evaluation and impacts of guides, and organization of a database on the main OHS guides
2. Analysis of the handling activities of a population of day workers in a large municipality: diagnostic step and validation of an analytical grid of the handling contexts
3. Integration of a sustainable MSD prevention culture in a large manufacturing company: step 1, systemic portrait of the company
4. Handling and women: from a biomechanical and ergonomic perspective
5. Development of an ambulatory method for estimating back loading: integration of back kinetics and surface electromyography

Special Projects
1. The costs of occupational injuries: a literature review
2. Indicators of compensated occupational injuries: analysis by industry and occupational category, Québec, 2005–2007
3. Mental health among teachers

Work Context and OHS
1. Project on the teaching and integration of workplace health and safety situation management knowledge: development of case studies
3. Conditions for the safe and effective integration of young workers into the mining sector

Safety of Industrial Tools, Machines, and Processes
1. Occupational health and safety risks, recommendations for preventive strategies for involved workers and companies in the wind energy sector
2. Multi-agent systems for supporting heavy-crane operators using real-time construction site data
Chemical Substances and Biological Agents

1. Development of expertise in metrology and in the generation of nanoparticles and ultrafine particles
2. Occupational exposures and reproductive functions of males: state of knowledge
3. Development of a generating chamber, a method for the metrology and measurement of the nanoparticle collection efficiency of filters
4. Development of a method for analyzing quartz in different matrices by X-ray diffraction
5. Development of a method for analyzing nitrosamines in the air by liquid chromatography coupled with mass spectrometry
6. Pulmonary toxicity of inhaled titanium dioxide nanoparticles: importance of the state of agglomeration of nanoparticles (pilot project)
7. Reevaluation of the reference values of biological exposure indicators in relation to the workload
8. Preliminary study on the promotion of data on the occupational exposure to chemical substances measured by the Québec public occupational health network teams
9. Characterization of dust exposure in the food industry
10. Is the absence of bronchial eosinophil a factor for a poor prognosis for occupational asthma?
11. The impact of adjacent buildings on the dispersion of emissions from buildings: a numerical (CFD) and experimental approach in a wind tunnel
12. Methods alternative and/or complementary to BeLPT
14. Evaluation of mycological biomass on surfaces of the aeraulic networks of ventilation systems
15. Evaluation of the role of archaebacteria in pulmonary inflammation in farm workers
16. Management of the risks related to the transportation and storage of hazardous materials
The theme of the aging workforce and OHS formed the backdrop to the Institute’s annual colloquium, which was attended by 150 people in October. The various program lectures touched on the demographic analysis of aging over the past 25 years, future projections, occupational injury statistics by age group and gender, aging-related issues confronting the workplace, aging-related occupational rehabilitation, interdependence, aging, employment, and retirement in Canada.

The following subjects were some of those broached in 2009:

- communication in a noisy environment;
- small enterprises and OHS;
- road accidents;
- the chemical resistance of gloves or protective equipment;
- occupational asthma;
- aging.

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The sharing of knowledge is at the heart of the scientific activities organized by each of the research fields. Whether in the form of colloquia, workshops, work meetings specifically for IRSST researchers, or sessions that are open, upon invitation, to members of the scientific community and to professionals from the prevention-inspection network, these activities serve as a forum for exchanging knowledge on a given theme. In addition to promoting the pooling of expertise and networking, these scientific activities also provide an opportunity to identify new research needs.

Paul-Émile Boileau, scientific director and Esther Cloutier, researcher, IRSST
Obliged to work in very narrow cabs and to sit on rudimentary seats with no suspension, subway operators working for the Société de transport de Montréal (STM) are exposed to whole-body vibrations and constraining postures that can cause discomfort and musculoskeletal disorders. Researchers faced the challenge of coming up with a seat prototype that would attenuate these constraints and fit into the confined space available.

The complexity of the problem required the input of various ergonomics, vibration, and engineering specialists. Scientists connected with the Musculoskeletal Disorders and Noise and Vibration research fields worked in collaboration with a joint working group made up of a maintenance supervisor, rolling stock engineer, a head of operations, an OHS coordinator, and three subway operators. A specialized company was contracted by the STM to design a seat prototype according to the criteria defined by the working group.

Simulations in a life-size mock-up cab and on a vibration simulator, verifications in a real cab, and in-depth tests in real work situations involving some 30 subway operators led to the development and testing of a seat prototype. Greatly appreciated by the operators, the seat designed generated less discomfort, attenuated vibrations, offered improved body support, and allowed for postures to be adapted according to whether the train was being driven manually or on automatic pilot.

The positive results obtained from this participatory process encouraged the STM to form a joint ergonomics committee to closely monitor the design of the new generation of trains. In addition, inspired by the research work, one of the requirements in the STM’s call for tenders was that a life-size mock-up of an operator’s cab be developed and tested by many operators during the process to ensure that the design of the operators’ work station took their occupational health and safety into account.

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\alpha_{1j} = \frac{\int_0^\pi a_{1j}(\theta) \sin \theta \cos \theta d\theta}{\pi \sin^2 \theta_{\text{min}}}
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Knowledge Gains by the Month
Some 60 researchers, partners from the social services network, professionals, and managers convened in Montréal to attend the official launch of the Work Context and Occupational Health and Safety (OHS) research field, which has adopted the slogan _Des approches globales pour une prévention durable_ (comprehensive approaches for sustainable prevention).

Around 40 scientists attended the lecture on the theme of "open access: why and how we should self-archive our work," organized by Maura Tomi from the Communications Division. The participants received a summary document explaining the genesis of this movement, which advocates universal, open, and free access to the articles published in scholarly journals. The guest speaker, Stevan Harnad, has been regarded as one of the main architects of the movement.

As part of a collaborative research project, two IRSST researchers, Franck Sgard and Hugues Nélisse, and two professors from the Université du Québec’s École de technologie supérieure (school of engineering) co-supervised three doctoral theses on hearing protectors. The main objective of this project was to develop modeling tools and measurement methods for improving and more effectively evaluating the acoustic performances of hearing protectors, while integrating a number of comfort-related features.

Charles Gagné, a knowledge transfer advisor at the IRSST, hosted a plenary meeting aimed at publicizing OHS succession management practices, at a symposium organized by the IRSST and the _Chaire en gestion de la santé et de la sécurité dans les organisations_ (CGSST) of Laval University. While most of the participants came from the health and education sectors, some also came from private enterprises, union associations, joint sector-based associations, and the CSST.

The IRSST was pleased to welcome Dr. Mary Trainor, Head of Science at the Health & Safety Laboratory, and Dr. David Fishwick of the Sheffield Occupational and Environmental Lung Injury Centre, both in the United Kingdom. Their visit was part of a European and North American tour of OHS research centres belonging to the Sheffield Group. The parties involved took the occasion to explore the possibility of new partnership endeavours.

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Developed by the IRSST, the Test Kit™ for pumps and batteries made its way into the United States where it was purchased by a leading laboratory. It was a technological transfer from the IRSST to SCL Medtech that led to the development of these test kits. This innovative product tests the reliability of workplace air-quality sampling pumps, allowing users to minimize the risk of wasting time and resources in the process.

Given that the usual risk assessment processes are inadequate for the task of quantifying exposure to nanoparticles, the IRSST and NanoQuébec selected four research projects in the area of metrology and exposure measurement following a joint call for proposals. The main criterion was that the projects promote the development of new strategies to ensure worker health and safety.

For the second year in a row, the IRSST partnered with three other organizations to stage INNO 09. The result of a collaborative effort by the IRSST, the Industrial Materials Institute of the National Research Council Canada (NRC-IMI), NanoQuébec, and the Association de la recherche industrielle du Québec (ADRIQ), this event provided an opportunity to promote research in the field of nanoparticles.

In her capacity as honorary president of the Association des professionnels en santé du travail convention (APST), IRSST president and CEO Marie Larue launched the event with her presentation outlining the Institute’s role and achievements in the area of rehabilitation.
The IRSST, the International Centre on Nanotechnology of Rice University (ICON), the British Columbia Nanotechnology Alliance, Industry Canada, and NanoQuébec joined forces to develop an international platform on nanotechnologies: www.GoodNanoGuide.org. This practical tool is designed for workers and researchers who manufacture, synthesize, or use nanoparticles. Other partners from the United States, Canada, and Europe also participated in the project.

No fewer than 150 participants from some 15 countries attended the 4th International Seminar on Training in Occupational Health and Safety of the ISSA (International Social Security Association) Section on Education and Training for Prevention. Held in Lisbon, Portugal, and co-organized by the IRSST, this seminar saw the adoption of the Lisbon Charter, which put forward a strategy for orienting and assisting young workers with regard to occupational health and safety matters.

The IRSST took part in the annual meeting of the Sheffield Group, which brings together the directors of the world’s leading OHS research centres.

The Institute met with the executive directors of the joint sector-based associations to present its 2009-2011 three-year plan, after prior consultations with them in this regard. The joint sector-based associations, which rank among the IRSST’s prevention partners, are also important intermediaries that pass on research results to enterprises operating in their activity sector.

Diane Hamelin-Bourassa, who holds a doctorate in immunology and microbiology, was appointed director of the IRSST’s Research and Expertise Division. Well-known for her management skills, she brings with her a 17-year track record in the pharmaceutical industry in connection with the health networks. The new director also completed a postdoctoral fellowship on the role of heredity in resistance to infection.

At the request of the Canadian Standards Association (CSA), demographer Patrice Duguay was appointed a member of the technical committee mandated to review CSA Standard Z795 Coding of Work Injury or Disease Information. CSA Standard Z795 proposes a consistent method for recording and classifying information on work-related injuries and occupational diseases in Canada.

The Institute’s Scientific Advisory Board held its special annual meeting featuring a variety of presentations. In one of these presentations, researchers Christian Larivière and André Plamondon illustrated the usefulness of biomechanical modeling as a tool for enhancing understanding of low back injuries and ensuring more effective prevention.

The REPAR/FRSQ published the États généraux de la recherche en adaptation-réadaptation 2009 – Rapport et stratégie de suivi. The objective of the preliminary consultation process was to portray the current status of research and share a common vision of its future and spin-offs. Ten partner organizations, including the IRSST, took part.

The IRSST handed Mr. Jacek Mlynarek, CEO of CTT Group, the Builder – Innovation System award at the Innovation Prize tribute evening of the Association de la recherche industrielle du Québec (ADRIQ). Starting next year, the IRSST will be awarding a new prize to a company with innovative OHS practices.
One hundred twenty-five individuals from 16 countries participated in the 4th International Conference on Whole-Body Vibration Injuries, held in Montréal. Organized by the Paul-Émile Boileau of the IRSST and Subash Rakheja of Concordia University, for the first time this conference was held in North America. It also stood apart from the previous conferences in that it welcomed practitioners, including physicians, ergonomists, hygienists, and preventionists, all of whom had an opportunity to exchange ideas with the researchers present.

At the International Economic Forum of the Americas, held in Montréal, the IRSST organized and led a workshop on the theme of sustainable development and mental health in the workplace. A number of speakers talked about the challenges this type of injury poses for research and prevention, including John Howard, director of the National Institute for Occupational Safety and Health (NIOSH) in the United States, Karen Russ, director of the Human Factors Group and Technical Programmes of the Health and Safety Laboratory (HSL) in the United Kingdom, and Marie Larue, IRSST president and CEO.

The IRSST welcomed a visit from Roberto Ocon, a specialist in the Programme on Safety and Health at Work and the Environment at the International Labour Office (ILO). Exploring opportunities for collaborative undertakings with OHS-specialized organizations, he had expressed interest in learning more about the IRSST’s mission.

A full professor in the Department of Environmental Science and Occupational Health at the Université de Montréal, Joseph Zayed was named research leader in the IRSST’s Chemical Substances and Biological Agents field. He holds a doctorate in public health with a specialization in environmental toxicology and has authored numerous scientific publications. Dr. Zayed was also the director of the Centre interuniversitaire de toxicologie and chaired the steering committee of the Canadian Network of Toxicology Centres.

The IRSST’s Board of Directors unanimously ratified the 2010 scientific and technical production plan.

The year 2009 saw the winding up of a five-year international cooperation project carried out by the Institute’s Jean-Claude Martin and François Hébert, together with various Canadian partners, with the goal of enhancing Brazil’s capacity to improve OHS conditions in its industries.

After winning a 3M Award at the annual conference of the Association québécoise pour l’hygiène, la santé et la sécurité du travail, chemist Simon Aubin received the award for the best presentation at the Chemical Vapor Sampling and Analysis session of the American Industrial Hygiene Conference and Exposition in Toronto. In both cases, he presented a paper on a new method for analyzing airborne nitrosamines, a paper that he co-authored with Lucie Locas and Suzanne Paradis.
Research does much more than simply enrich knowledge. Promoted and presented in a simple form, the evidence obtained through research generates its own concrete spin-offs. They take the form of guides, technical fact sheets, and brochures, and are used to fuel discussion at forums, colloquia, and training sessions, and on Web sites. Combined with partners’ expertise, mainly that of joint sector-based associations, this knowledge is first and foremost intended for use by workplaces and OHS professionals.

The Spin-Offs of Knowledge

Designed along the lines of a self-diagnostic checklist, this fact sheet established the main themes for a lockout program. Referring to the Act respecting occupational health and safety, the Regulation respecting occupational health and safety, and CAN/CSA Standard Z460-05, it is designed to serve as a tool for verifying the content of lockout programs.

Lift trucks, ice surfacers, and other similar equipment (such as mechanical street sweepers and aerial platforms) activated by propane-powered combustion engines can expose workers to toxic gases. This technical fact sheet deals mainly with means of prevention, preventive maintenance, and the technological developments taking place in these machines.

Developed for manufacturers, potential purchasers, and garbage truck operators, this technical fact sheet describes the criteria for outfitting trucks with articulated arms and proposes improvements, taking into account requirements for the new tasks performed by waste collectors.

Workers who spray polyurethane foam run the risk of exposure to 4,4’-diphenylmethane diisocyanate (MDI) in aerosol form, particularly when performing this work indoors. This best practices guide describes the dangers and risk factors associated with the application of thermal insulation, as well as means for controlling them.

In a context of a workforce shortage, offering meaningful work in a stimulating environment represents a major plus for both employers and workers. This document, designed for managers and OHS professionals and to serve as a tool for sparking reflection on psychological health, including mental health, in the workplace, describes the characteristics that make work meaningful. It proposes avenues for reflection on possible ways to implement strategies for reinforcing the meaning that employees attribute to their work, as it constitutes a determining factor in their mental health, attitude, and performance.
A five-year partnership framework agreement between Japan’s National Institute of Occupational Safety and Health (JNIOSH) and the IRSST set forth the principles for OHS research and expertise collaboration, particularly in the area of nanotechnologies and vibrations. It gave rise to a first specific agreement allowing the JNIOSH to translate and disseminate the IRSST-developed Best Practices Guide to Synthetic Nanoparticle Risk Management.

An agreement was clinched with the Groupe d’acoustique de l’Université de Sherbrooke (GAUS) that allows IRSST researchers to use GAUS instruments in the context of joint research projects.

A memorandum of understanding regarding collaboration in the form of eventual joint funding of projects was signed with Agrivita Canada Inc. in the context of the Canadian AgriSafety Applied Research Program.

Machine safety was the focal point of a specific agreement between the IRSST and the Institut national de recherche et de sécurité (INRS France). It allows researchers from Québec and France to participate in studies of common interest and provides them with priority access to the results and data emerging from studies carried out by either of the signatories.

An agreement ratified with the Université du Québec’s École de technologie supérieure (ÉTS) gave IRSST personnel the green light, for a period of ten years, to use the anechoic chamber and related equipment in the ÉTS’s new acoustic laboratory.

A cooperation agreement was reached with the Health and Safety Laboratory (HSL) of the United Kingdom regarding the theoretical analysis of tools for estimating the risks associated with industrial machines.

The IRSST and the Workplace Health, Safety and Compensation Commission (WHSCC) of Newfoundland and Labrador signed an agreement to conduct a review of the scientific literature on the risks of occupational cancer for shipyard workers.

Working as partners, the IRSST and the REPAR/FRSQ launched a call for proposals for research projects that support the production of a state-of-the-knowledge review of knee osteoarthritis in workers aged 15 to 65. The review was required to cover (a) clinical assessments/measurements whose validity, reliability, and responsiveness to change have been documented; (b) front-line medical and rehabilitation interventions whose effectiveness and efficiency have been documented; and (c) decision-making processes involved in a safe and sustainable return to work.

Twenty-two contractual agreements were signed with various partners, giving the IRSST’s added research capacities. The sharing of human and physical resources, exchange of expertise, and knowledge brokering and transfer are all multiplier effects that generate positive spin-offs for the signatories to these agreements.
Every year, the CSST, the Ministère de la Santé et des Services sociaux, joint sector-based associations, and companies send tens of thousands of samples to the IRSST’s Laboratory Services and Expertise Department for environmental, toxicological or microbiological analyses. To respond effectively to the needs of the stakeholders in this network, the laboratories offer them services whose quality is certified through both national and international accreditations. They also develop new analytical methods.

Nitrosamines

For the IRSST’s laboratories, 2009 was further marked by the rendering of the nitrosamine analysis method available for use. This method sparked the curiosity of several American laboratories and of a large sampling equipment company that expressed interest in marketing an alternative to the Thermosorb/N adsorbent tube currently used for nitrosamine sampling. The new sampling device, which was developed by INRS France, was adapted and validated by the IRSST in the field.

Agreements

The IRSST’s laboratories signed two agreements with an agency of Québec’s Ministère du Développement durable, de l’Environnement et des Parcs, specifically, the Centre d’expertise en analyse environnementale (CEAEQ). The first agreement, which dealt with air microbiology, paved the way for development of an accreditation program to be offered on a voluntary basis to public and private laboratories wishing to offer their clients this service. The second agreement concerned the transfer, to the IRSST, of CEAEQ expertise that would enable IRSST’s laboratories to obtain accreditation for the development of proficiency testing schemes by laboratory intercomparisons.
To promote the emergence of social networks of OHS professionals, the IRSST has integrated applications such as Facebook, Twitter, YouTube, and RSS feeds into its strategies for disseminating research results. The Communications Division is making unprecedented use of Web-based opportunities in its efforts to reach a younger public that has particular interests in OHS research. Complementing the IRSST Web site and its electronic newsletter, Info IRSST; these various technological applications open up new possibilities for spreading the word about the Institute’s scientific and technical production.

Entering the Blogosphere

A specific forum for dialogue on research was created on the Web to foster interactivity: l’IRSST en lien avec vous. On this page, the Institute posts an institutional blog hosted by the CEO, the nine blogs run by the Strategic Watch and Quality Management Department, and the research section of the Prévention au travail blog, which, with its satellite Web site, is designed to complement the magazine. The launching of a forum for dialogue on manual handling completes the list of the different interactive tools offered in 2009.

The use of these various applications gives greater visibility to research reports, particularly scientific documents published during the year. It also increases the number of document downloads, which continue to rise from one year to the next, reaching 397,000 in 2009.

Lastly, a business plan was drawn up for the purpose of developing a third-generation Web site for the IRSST.
HR: A Font of Knowledge for Tomorrow

As part of its efforts to groom the next generation of scientists, the IRSST awarded 48 scholarships to students from among the 82 applicants. Eighteen new scholarships were thus granted and 30 applications for renewal were accepted. The scholarship program underwent an in-depth revision. Its regulations, procedures, application forms, and calendar were modified taking into account primarily the practices of other granting agencies. The scientific merit of scholarship applications is evaluated by a multi-disciplinary committee. This formula was retained after an extremely positive testing experience in a pilot project. In addition, the specific program designed as an incentive to the next generation to undertake postdoctoral fellowships is currently being enhanced. This program will require them to integrate a knowledge transfer component into their reports.

Occupational Health and Safety Committee

In 2009, nine reports were logged in the accident, incident, and first-aid register. Two accidents were the subject of investigation. As part of a training program, 33 individuals participated in mask adjustment tests for respiratory protection masks.
Financing Knowledge

Breakdown (in %) of revenues and expenditures as at December 31, 2009

**REVENUES: $22,167,132**

- 83.96% CSST
- 11.53% Laboratory services
- 2.05% Contracts
- 1.98% Special projects
- 0.25% Beryllium project

**EXPENDITURES: $22,680,344**

- 48.93% Internal research
- 17.31% External research
- 11.23% Laboratory services
- 10.36% Finance and administration
- 4.64% Communications
- 3.24% Management
- 2.07% Special projects
- 1.97% External contracts
- 0.25% Beryllium project
In 2009, the members of the Management Committee met 19 times, while those of the expanded Management Committee met seven times.
Committees as at December 31, 2009

On behalf of the IRSST and its personnel, the president and CEO welcomes the new members of the board and committees and offers her sincerest thanks to outgoing members for jobs well done.

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<thead>
<tr>
<th>Board of Directors</th>
<th>Scientific Advisory Board</th>
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<tbody>
<tr>
<td><em><em>In 2009, the members of the Board of Directors met nine times while the Administrative Committee</em> held seven work sessions.</em>*</td>
<td><strong>The members of the Scientific Advisory Board met nine times.</strong></td>
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Laboratory Methods


Scientific Publications


Reports Published in Collaboration with Partners


NGUYEN C. T., VU-KHANH T. Mechanics and mechanisms of puncture by medical needl


Peer-Reviewed Articles Published in Conference Proceedings


of T regulatory cells are inhibited in a virus-induced mouse model of metier semi-spécialisé.


To contribute, through research, to the prevention of industrial accidents and occupational diseases, and to the rehabilitation of affected workers.

To disseminate knowledge and serve as a scientific reference centre and expert.

To provide the laboratory services and expertise required to support the public occupational health and safety prevention network.

Through its leadership in occupational health and safety research, the IRSST seeks:

- To consolidate its role as a reference centre vital to the operations and strategies of the CSST and its network;
- To be used by all its partners in a spirit of joint collaboration;
- To win recognition at the national and international levels;
- To derive maximum benefit from a well-established network of research and development collaborators.