

Activity Report 2013

**Because prevention
in the workplace
is vital!**



About 249,000 results (0.32 second)

IRSST

www.irsst.qc.ca/en/home.html ▾

The IRSST, established in Québec since 1980, is a scientific research organization well known for the quality of its work and the expertise of its personnel ...

IRSST

Find a publication – Laboratory
Services – Directory – Scholarships

Find a publication

Calculation of the R_m

Exposure to mixtures of chemical
substances in the workplace ...

Grants

About 249,000 results (0.32 second)

IRSST

www.irsst.qc.ca/en/home.html ▾

The IRSST, established in Québec since 1980, is a scientific research organization well-known for the quality of its work and the expertise of its personnel ...

IRSST

Find a publication – Laboratory
Services – Directory – Scholarships

Find a publication

Access the directory of the IRSST's publications, which ...

Status

Status. The Institut de recherche
Robert-Sauvé en santé et en ...

[More results from irsst.qc.ca »](#)

Calculation of the Rm

Exposure to mixtures of chemical
substances in the workplace ...

Grants

The IRSST pays \$3.4 million every
year for the ...

Scholarships

Graduate scholarships and
postdoctoral fellowships are ...

IRSST (IRSST) on Twitter

<https://twitter.com/IRSST> ▾ [Translate this page](#)

The latest from the **IRSST (@IRSST)**. To disseminate knowledge and serve as a scientific reference centre and expert; To provide the laboratory services ...

IRSST - YouTube

#2013

**Because prevention
in the workplace
is vital!**





DECLARATION OF DATA RELIABILITY

I declare that I have every reason to believe that the observable facts and measurable data presented in this activity report accurately reflect the situation as at December 31, 2013. This information falls under my responsibility as president and CEO of the Institut de recherche Robert-Sauvé en santé et en sécurité du travail (IRSST). I hereby attest to its accuracy and the rigour of the controls relating thereto.

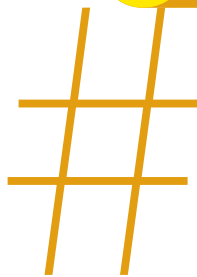
The indicators retained are developed using reliable data and allow us to assess the IRSST's production over the course of the year.

Recommended by the members of the IRSST's Scientific Advisory Board and approved by its Board of Directors, the 2013 activity report faithfully describes the Institute's mission, vision, and principal achievements.

Marie Larue
President and CEO



TABLE OF CONTENTS



Message from the President and CEO	6
2013 in Numbers	8
A Five-Year Plan	10
New Knowledge	12
Research Partners	15
The IRSST, a WHO Collaborating Centre	19
Research Stewardship	20
Knowledge Transfer	21
Laboratories	26
Communication	28
Most Popular Publications in 2013	32
Sustainable Development	33
Human Resources Dedicated to Research	34
Governance	36
Research Funding	38
Appendix	
Research Activities	
IRSST Publications	
Scientific Publications	

Message from the President and CEO

#



Marie Larue

A driver of economic development and social relationships, work is an essential component of our lives. Among other things, it allows wealth to be shared, services offered, and consumer goods produced. From another perspective, while work clearly enhances both collective and individual worth, it can also be synonymous with disease, injury, and even mortality if the dangers it poses are not eliminated, preferably at the source. This is where the IRSST and its partners come in.

We conduct research activities and share our knowledge and expertise first and foremost because that is our mission, but also because we firmly believe in what we do. And because prevention in the workplace is vital! We all subscribe to the IRSST's mission, namely, to contribute through research to the prevention of industrial accidents and occupational diseases and to the rehabilitation of affected workers. We do so for **all** Québec workers—present and future; young and old; women and men; novice, experienced, and expert—and for all employers.

In 2013, we put the finishing touches on our five-year scientific and technical production plan, thereby mapping out a trajectory and a work plan for the Institute's four research fields, laboratories, and other divisions and departments for the 2013–2017 period.

This five-year plan is the outcome of a series of fruitful consultations held with our partners in the work and research communities to ensure that the Institute's initiatives respond to both current and emerging needs. The year's achievements included two unprecedented studies that also pointed the way to original avenues of research to guide our actions. One of them assessed, for the first time ever in Québec, the **overall** costs of employment injuries by taking into account the human and financial costs to society as a whole rather than simply the direct and indirect costs borne by employers. The second ground-breaking study assessed the number of the most prevalent cancers that are most often associated with an occupational cause. While we must take heart from the continuing decline in the number of occupational injuries witnessed in recent years, we must not overlook the fact that during this same period, the number of occupational diseases, including occupational cancers, rose steadily. We must therefore turn our attention to the etiology of these cancers, regardless of their multi-factorial nature.

To fulfill our mission, we also need a new generation of scientific professionals. This is a pressing issue, but the plan drawn up and endorsed by our governing bodies is already suggesting positive results that will eventually meet our research needs in both the machine safety and protective equipment field and that of chemical and biological hazard prevention, two areas where the upcoming workforce has been scarce to date.

On the organizational level, in 2013 we continued our efforts to improve research project management to ensure, among other things, our capacity to deliver quality and opportune results on time. All our internal researchers are trained in this improved project management process, and the fact that it was well received by participating external researchers augurs well for the future.

However, organizational efficiency alone cannot guarantee success. To ensure that our work is useful and our mission is accomplished, our research choices and their results, as well as our laboratory analyses and knowledge transfer products, must be of impeccable calibre. Of course, rules are already in place regarding the sound management of scientific activities, but I am pleased to report that 2013 signalled the launch of a rigorous process that should result in the IRSST's adoption of its own research ethics and integrity policy. We are thus committed to ensuring the integrity of decisions made during all processes because, ultimately, what is at stake is the degree of confidence that our partners and clients place in research.

In terms of our reputation, we are proud to announce that in 2013 the World Health Organization (WHO) ranked the IRSST's Scientific Division as one of its collaborating centres in the area of occupational health. As such, we provide the WHO with strategic support for the accomplishment of its mission, notably regarding nanotechnologies.

In conclusion, I wish to salute all those men and women whose efforts enable the Institute to further the cause of occupational injury prevention and worker rehabilitation in concrete terms. Without your contribution, the IRSST's 2013 track record would not be what it is. Please accept my sincerest thanks, because as we well know, prevention in the workplace is vital!



Because #prevention
in the workplace is vital!



#2013 **in numbers**

Production

188 active projects and activities

- **38** projects being developed
- **39** projects began
(17 joint, 16 external, and 6 internal)
- **38** completed projects
- **73** projects in progress

198 partner organizations from the OHS network were involved in active projects

79 new requests for expertise were received

46 external committees included at least one IRSST representative:

- **12** committees of the CSST and its network, including regulatory committees
- **13** national and international standards committees
- **21** other local, national, and international committees

202 external researchers

from **17** universities and **16** research centres formed part of the IRSST's network of research collaborators

73,978 environmental, toxicological, and microbiological analyses

were performed, including **71%** for partners in the prevention-inspection network: the CSST, local health and social services agencies, and joint sector-based associations. Our laboratories reported a **6%** increase in the total number of analyses performed compared to 2012.

8,617 hours were spent on the calibration, maintenance, and repair

of direct-reading and sampling instruments, of which **78%** were for the OHS and prevention-inspection network. This number represents an increase of **9%** over the previous year.

Outreach

49 publications

- **43** research reports, technical fact sheets, and guides published by the IRSST
- **4** documents published in collaboration with partners
- **2** laboratory methods

80 scientific peer-reviewed publications

related to projects carried out or funded by the IRSST:

- **58** journal articles
- **13** articles published in conference proceedings
- **9** other publications, such as book chapters, master's theses, and doctoral dissertations

100 presentations

given by IRSST personnel or IRSST-funded researchers at scientific conferences or events organized by partners

22 simplified articles

in *Prévention au travail*, the magazine published by the CSST and IRSST

10% increase in downloads

of publications disseminated on the IRSST's Web sites

16,431 subscribers

to *InfoIRSST*, the Institute's electronic newsletter

IRSST - October 21, 2013

36
scholarships are awarded,
for a total of \$380,673



Like • Comment • Share

#

A Five-Year Plan

In 2013, the Board of Directors ratified the Institute's *Scientific and Technical Production Plan* for the 2013–2017 period and gave the go-ahead for its implementation. The plan's adoption was a major highlight of the year. It represented the culmination of the great efforts made by the personnel of the Scientific Division and the IRSST as a whole to provide a plan whose content corresponds to the expectations of the Institute's partners and clients and whose duration better reflects the research activity cycle. During the iterative process leading to the plan's development and adoption, the IRSST stepped up its exchanges with its many partners and drew information from the work and scientific communities to ensure that the plan's content met workplaces' current and future needs for research and expertise.



This ambitious plan, which fits in with the Institute's mission, charts the course of each division and department to ensure the organization's harmonious development.

It seeks mainly to detail the challenges ahead, specifically those of:

1. Ensuring the viability of the research fields in a context of limited resources
2. Delivering the results of research activities to its various clientele, both diligently and efficiently
3. Increasing the uptake of research results by workplaces and the scientific community
4. Remaining attractive and competitive as a key OHS research organization and maintaining local, national, and international recognition of its scientific leadership
5. Ensuring an ongoing offer of diversified laboratory services adapted to the new realities of the work world.

The plan describes the characteristics, objectives, research orientations, and thematic programs of each of the IRSST's four priority research fields, as well as its scientific watch, statistical surveillance, and scientific outreach activities. It reports on progress in current work and developments anticipated over the next five years.

The plan also details the laboratory work envisaged in order to maintain current accreditations and obtain a new one as a proficiency testing provider (ISO 17043). The latter will, in turn, help secure recognition of the Institute's role in developing quality controls for the analysis of substances such as asbestos and isocyanates. With regard to analytical developments, our laboratories will have to complete five projects to provide their clientele with new services.

In addition, the five-year plan covers topics related to the next generation of researchers and their training, as well as project management, partnership agreements, and knowledge transfer, dissemination, and communication activities.

IRSST A five-year research activity plan for the IRSST



Press release

www.irsst.qc.ca May 16, 2013 – Content that meets current research and expertise needs, but also future requirements of workplaces...



Like · Comment · Share

#

New Knowledge

Every year, the IRSST's scientists and the external researchers whose work it funds conduct studies and publish results that contribute to the advancement of knowledge about occupational injury prevention and worker rehabilitation. The year 2013 was no exception. While this new knowledge takes multiple forms, its ultimate goal remains the same: to help equip workplaces to carry out their mission: "the elimination, at the source, of dangers to the health, safety and physical well-being of workers," which is the main aim of the *Act respecting Occupational Health and Safety (AOHS)*. Given that it is not always possible to attain this primary prevention objective, the IRSST must conduct studies on secondary and tertiary prevention as well. One thing is certain, however: the results of these studies help build OHS knowledge, sometimes through breakthroughs or major advances, but more often brick by brick. The peer-reviewed results are often unprecedented, and are always based on evidence and solid scientific foundations. They also allow new research avenues to be explored.

Here are some prime examples of activities the results of which were published in 2013.

You Tube



ROAD ACCIDENTS



While the downward trend in work-related accidents is well known and documented, we often overlook the fact that road accidents are the leading cause of accidental occupational deaths. Two research reports, in which scientists **François Bellavance** of HEC Montréal and **Patrice Duguay** of the IRSST played a part, cast new light on this phenomenon and provided a clearer understanding as to why these types of accidents cause the majority of fatalities resulting from or occurring during work.



First, a literature review documented existing knowledge about the risk factors associated with vehicle drivers and passengers, the immediate physical environment (the vehicle), the external physical environment (the road), the organizational work environment (the company), and the political environment (laws and regulations). Without neglecting road properties, companies' prevention efforts, and legislation, the literature review highlights the phenomenon of driver fatigue. While fatigue applies mainly to truck drivers, it is the factor most

frequently studied among those contributing to the increased risk of occupational road accidents. The authors focussed on the essential role that transportation companies can play by adopting a safety policy on several aspects of driving such as seat belt use, establishing realistic work hours, and applying a method of remuneration that promotes safety.

Second, the research team drew up an original profile of occupational road accidents by creating a unique database with information compiled by the Commission de la santé et de la sécurité du travail (CSST) and the Société d'assurance automobile du Québec (SAAQ). Among other things, the scientists analyzed data on more than 8,000 workers compensated by the CSST following occupational road accidents that occurred between 2000 and 2008. The wealth of information in this database provides a **better understanding of these accidents, ultimately for the purpose of improving prevention.**

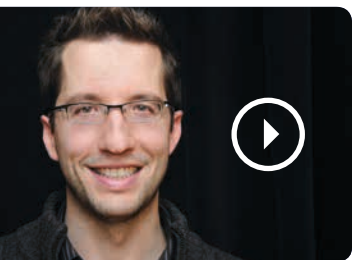


FACTORING IN HUMAN COSTS: ANOTHER WAY OF SETTING PRIORITIES

Until 2013, no study had assessed the overall costs of industrial accidents and occupational diseases in Québec. All the documented studies simply calculated the direct and indirect costs borne by employers. A team headed by economist **Martin Lebeau** of the IRSST innovated by utilizing proven methods to estimate both the human and financial costs of occupational injuries to society as a whole. Using CSST data for 2005–2007 and applying the model retained, the team found that such injuries cost an average of over \$4.6 billion annually, meaning an average cost

of approximately **\$38,500 per injury**. More than half of this amount, or \$2.9 billion, was attributable to human costs.

All economic models have their scope and limitations, but this method of assessing the reality offers a more comprehensive and complementary approach than one involving only traditional indicators. Studies such as this provide the Institute with yet another way of setting priorities among its research activities in the area of prevention and return to work.



The costs of occupational injuries in Québec, 2005–2007

IRSST - Studies on the costs of occupational injuries in Québec are scarce. The few Québec studies documented estimate the costs borne specifically by companies. This study innovates by estimating the overall costs of...





PREVENTING CANCERS THAT COULD BE ATTRIBUTABLE TO WORK

Painting a reliable picture of occupational cancers is a very arduous task, largely because of the latency period between exposure to the causal agent and diagnosis of the disease; the latency period can in fact run anywhere from 10 to 50 years. For the first time in Québec, a study quantified the number of cancers that could be attributable to work for around 20 of the most prevalent and most frequently work-related injury sites or types of cancer.

To do so, a research team led by epidemiologist **France Labrèche** of the IRSST took into account the CSST's compensation statistics, but above all, applied the proportions of cancers attributable to work that were cited in publications by scientists from countries with economic activity profiles similar to those of Québec, namely Finland and Great Britain.

By applying these proportions to Québec data, it was estimated that **6% (from 5 to 8%) of all new cancers could have been caused by work**, for a total of 1,800 to 3,000 new cases a year, from 2002 to 2006.

Despite its limitations, this study, which was essential to determining possible avenues of research, sought to eliminate occupational risks associated with exposure to carcinogenic substances and situations.



BIOAEROSOLS: CONTROL BANDING

What should be done to protect workers and reduce the effects of contaminants on their health when no permissible exposure limits (PELs) exist, there is insufficient toxicological data available, or the existing sampling techniques are sub-optimal? A team of experts studied this question in relation to bioaerosols and proposed approaches appropriate for uncertain contexts.

Headed by biologist and occupational hygienist **Jacques Lavoie** of the IRSST, the team proposed a control banding approach for **selecting respirators suitable for the bioaerosols present in diverse forms in the workplace**. The model takes the form of a matrix comprising the four risk groups used in biosafety and five exposure levels. By cross-tabulating the data, the user obtains an assigned protection factor that can be used to choose an appropriate respirator.



#

Research Partners

Partners are important in many respects. They help raise the IRSST's research capacity to the next level and increase its influence in the university community and the world of work. By doing so, they expand its outreach on the local, national, and international scenes.

Some agreements generate financial spin-offs while others have structuring effects. By promoting the signature of partnership agreements, the Institute rubs shoulders with the top research centres, a proximity that in turn reaps benefits. Through the sharing of human, financial, and physical resources, the parties involved gain access to means they would not otherwise have, notably by drawing on the expertise of partners in fields where they lack the necessary resources. These beneficial partnerships act as stimulants that broaden the skills spectrum of the Institute's scientific and technical personnel.

In 2013, the Institute was a signatory to some 50 agreements, including the following:





Signed in 2013, the agreement with the **Canadian Institutes of Health Research (CIHR)** regarding the joint funding of an OHS research chair on gender, work, and health—the first of its kind in Canada—gave rise to a study program. One of the goals of this program, entitled “Better understanding for better prevention of work-related musculoskeletal disorders: a coordinated gender- and sex-based approach,” is to further understanding of the mechanisms involved in the onset of musculoskeletal disorders (MSDs) at work, with a focus on the neck-shoulder region, muscle activation patterns, and work postures. The chairholder is **Julie Côté** of McGill University’s Department of Kinesiology and Physical Education.



In collaboration with a number of other organizations, the IRSST contributed to the *Étude longitudinale sur le développement des enfants du Québec* (Québec longitudinal study of child development, QLSCD). The interest shown by the **Institut de la statistique du Québec (ISQ)** in incorporating a component on young workers prompted the Institute to develop a data collection tool that will be used in phase 3 of the QLSCD to document the employment conditions and work environment encountered by young people, as well as the injuries they report. This agreement authorizes the IRSST and other organizations to use the ISQ’s database to create a master file that will point to possible avenues of research to be explored regarding young workers and OHS.



The partnership agreement with the **Association francophone pour le savoir (ACFAS)** bore its first fruit when the IRSST handed out two *ACFAS-IRSST-Santé et sécurité du travail* awards on the *Journée de la relève en recherche* (a day dedicated to the next generation of researchers). **Véronique Dansereau**, a Université de Montréal master’s student in industrial relations who is specializing in OHS, received the *Prix Maîtrise* from **Marie Larue**, the Institute’s president and CEO. Véronique’s research project concerns issues related to psychological health at work and is being supervised by **Nancy Beauregard**, herself a former IRSST scholarship recipient. The *Prix Doctorat* was handed to another IRSST scholarship recipient, **Valérie Albert**, who is registered in an interdisciplinary health and society doctoral program with a specialization in ergonomics and program evaluation at the Université du Québec à Montréal. She is working under the supervision of **Nicole Vézina** and **Henriette Bilodeau**, two researchers whose work is funded by the Institute.



Véronique Dansereau, student; Marie Larue, IRSST president and CEO



A second call for proposals issued in 2012 under a specific partnership agreement with **NanoQuébec** led to the start-up, in 2013, of three research projects on exposure to manufactured nanoparticles. They concern the effectiveness of protective equipment; sampling and characterization methods; and development of prototypes for evaluating respiratory and skin exposure.



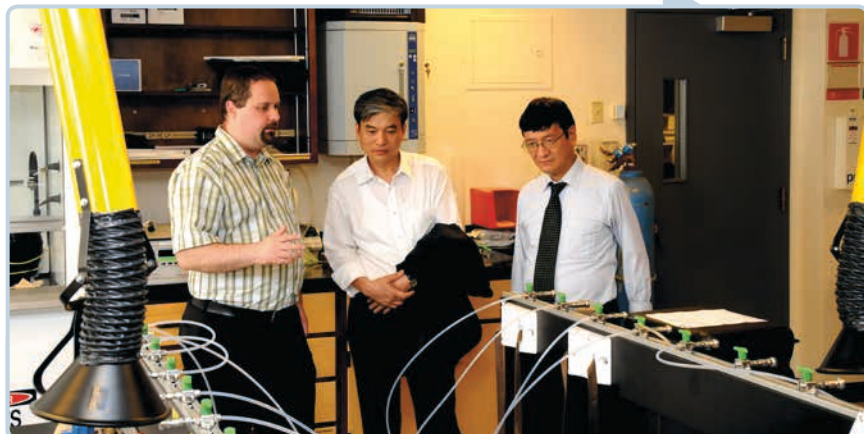
France's **Institut national de recherche et de sécurité pour la prévention des accidents du travail et des maladies professionnelles** (INRS), the **Université de Montréal**, and the IRSST signed a partnership agreement aimed at adapting the computer-based tool *Mixie* to the French context. This tool aids in assessing the risk of exposure to mixtures of chemical substances.



The specific agreement with the **Institute for Occupational Safety and Health** (IFA, of the German Social Accident Insurance umbrella association) concerning MSD measurement instruments was renewed. It enables researchers to compare and perfect devices developed by the two research centres.



A master cooperation agreement was also signed with Vietnam's **National Institute of Labor Protection** (NILP). It paves the way to exchanges that could lead to the drafting of a specific agreement on metal and solvent analysis.



Sébastien Gagné, a chemist at the IRSST; Pham Van Hai, director of Vietnam's NILP; Le Van Trinh, chairman of the scientific advisory board of Vietnam's national OHS program



OUR MAIN PARTNERS IN 2013

There were many—established in Québec, Canada, or elsewhere around the world—and they were all linked with the IRSST in 2013 through research-related partnership agreements.

Local partners

Association des établissements de réadaptation en déficience physique du Québec (AERDPQ)

Association francophone pour le savoir (ACFAS)

Association québécoise d'établissements de santé et de services sociaux (AQESSS)

Centre d'action en prévention et réadaptation de l'incapacité au travail (CAPRIT)

Centre d'expertise en analyse environnementale du Québec (CEAEQ)

Centre hospitalier universitaire Sainte-Justine

Direction de la santé publique de Montréal (DSP)

École de technologie supérieure (ÉTS)

Polytechnique Montréal

Fondation Lucie et André Chagnon

Fonds de recherche du Québec

CTT Group

Groupe d'acoustique de l'Université de Sherbrooke (GAUS)

Hydro-Québec

Immunit Rimouskilab inc.

Institut Armand-Frappier

Institut de la statistique du Québec (ISQ)

Institut thoracique de Montréal

Ministère de l'Éducation, du Loisir et du Sport

Ministère de la Famille

Ministère de la Santé et des Services sociaux (MSSS)

NanoQuébec

Ne3LS

Quebec Rehabilitation Research Network (REPAR)

Université de Montréal

Université du Québec à Montréal (UQAM)

National partners

Agrivita Canada Inc.

Canadian Institutes of Health Research (CIHR)

Human Resources and Skills Development Canada (HRSDC)

University of Saskatchewan

Workplace Health, Safety and Compensation Commission of Newfoundland and Labrador (WHSCC)

International partners

Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail (ANSES), France

Agence régionale de santé d'Île de France

Health and Safety Laboratory (HSL), United Kingdom

Institute for Occupational Safety and Health of the German Social Accident Insurance (IFA), Germany

Institut national de recherche et de sécurité pour la prévention des accidents du travail et des maladies professionnelles (INRS), France

National Institute for Occupational Safety and Health (JNIOSH), Japan

National Institute of Labor Protection (NILP), Vietnam

#

The IRSST, a WHO Collaborating Centre

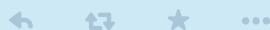
With 33 years of scientific activities to its credit, the IRSST became a collaborating centre (CC) of the World Health Organization (WHO) in 2013 in the area of occupational health. On behalf of WHO, the Pan American Health Organization (PAHO) included the IRSST's Scientific Division among its CCs, whose role is to provide WHO with strategic support in carrying out its mandate. **Paul-Émile Boileau**, director of the Institute's Scientific Division, is the person responsible for this new collaborating centre, which forms part of a network of more than 70 institutions active in the field of occupational health and safety around the world.



After four years of efforts, two involving active collaboration with PAHO, WHO ratified the work plan proposed by the Institute and named the IRSST's Scientific Division one of its collaborating centres. In return, the Institute committed to assisting WHO in executing this work plan, which includes six activities on the characterization, handling, control of occupational exposure, and good practices regarding safe use of nanoparticles; the development of OHS surveillance indicators; and the design of practical tools that could prevent or limit the impacts of exposure to extreme weather conditions on OHS, all from a sustainable development perspective. WHO promotes three types of activities: research, training, and education, as well as the collection and dissemination of knowledge.



The IRSST becomes a collaborating centre (CC) of the World Health Organization
<http://ow.ly/k6dIt>



#

Research Stewardship

Launched in 2011, the research-project management improvement process is intended to increase the organizational efficiency of the Institute's activities, from start to finish and including the planning stages. The Research and Expertise Division applied this process to **37** projects or activities in 2013. All in-house scientists received the appropriate training in this regard.

A survey of 36 participants revealed that, on the whole, the experience was regarded as more than positive, with a satisfaction rate of 90% or higher with all aspects of the process: representativeness, time and profitability, constructiveness, project presentation, relevance of the facets covered, and production of the status report. These results led to the application of the process to all internal and external projects and to the introduction of a management tool better suited to tracking project progress.

To date, the implementation of this process has had a number of clear benefits:

- the solid anchoring of the projects in workplaces
- greater coherence between goals, methods, and deliverables
- improved coordination of the activities required to carry out the work
- sounder analysis of the risks and mitigation measures, etc.

The ultimate aim of the process is to optimize project management in terms of allocated resources, deadlines, and quality of deliverables.

#

Knowledge Transfer

The Communications and Knowledge Transfer Division (CKTD) ensures that the evidence-based data generated by the Institute's scientific studies and its personnel's expertise are appropriately handled to maximize the benefits for workplaces. To achieve this goal, it assigns a follow-up committee to most research activities right from the project development phase. These committees, which are composed of preventionists and representatives of employer, union, and trade associations, leverage their expertise to serve research so that the results are presented in a form that facilitates uptake by workplaces.

Partners from 198 organizations sit on the various follow-up committees.

In 2013, the CKTD had 11 activities under way and launched six new knowledge transfer activities.

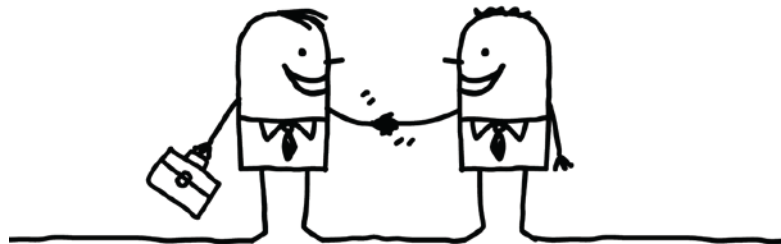


The IRSST shared a link - May 21, 2013

A matter that concerns us all! — Preventing workplace violence

Based on the advancement of knowledge that has resulted from ten years of research on violence prevention, this new Web site describes a practical, proven process aimed at the sustainable prevention of workplace violence and suitable for all types of organizations.

<http://www.irsst.qc.ca/preventionviolence/>

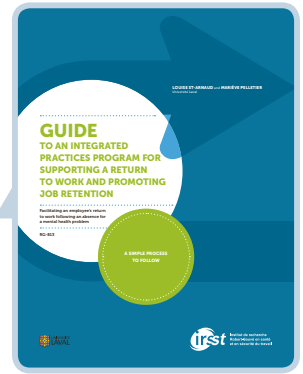


Like • Comment • Share



GUIDE TO AN INTEGRATED PRACTICES PROGRAM FOR SUPPORTING THE RETURN TO WORK AND PROMOTING JOB RETENTION

Mental health problems, which are one of the main causes of work absence due to the long periods of disability they entail, remain a key concern for employers and workers. To facilitate the return to work and promote job retention, an assistance and support guide based on the research work of **Louise St-Arnaud** (from Université Laval) was made available to organizations. Its originality lies in its integrated practices approach to occupational health, an approach that takes into account, among other things, the need to act not just on the worker but on the work itself. Informative video capsules make the content more dynamic.



TOOLS FOR THE AUTOMOBILE SERVICES SECTOR —PREVENTING AND REDUCING UPPER LIMB MSDS



Five technical fact sheets entitled *L'esthétique automobile* (car detailing), *La carrosserie* (autobody work), *La mécanique sous le capot* (under-the-hood mechanics), *La mécanique sous le véhicule* (under-the-vehicle mechanics), and *Le service de pneus* (tire service), as well as a video, were produced with a view to improving prevention of upper limb musculoskeletal disorders in the automobile services sector. Developed in collaboration with the joint sector-based association, Auto Prévention, and UQAM researcher **Denis Marchand**, these documents offer a goldmine of explanations, examples, and tips for workers in this sector, preventionists, and vocational training teachers and students.



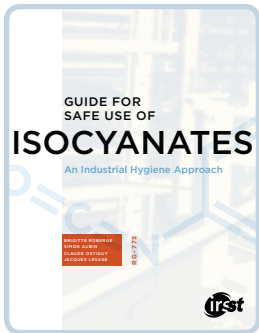
ARE THERE CARCINOGENS IN YOUR WORKPLACE? IT'S TIME TO ACT!

Easy to consult and use, this awareness-raising document is intended to support implementation of appropriate measures for preventing occupational cancers. This publication, which is applauded by the Canadian Cancer Society and derived from the work of the IRSST's **France Labrèche**, urges those responsible for OHS, as well as employers and workers, to take action now. A fact sheet designed specifically for workers encourages them to adopt good practices to reduce their risk of exposure to carcinogenic substances and of contracting work-related cancers.





GUIDE FOR SAFE USE OF ISOCYANATES – AN INDUSTRIAL HYGIENE APPROACH



The second edition of the *Guide for Safe Use of Isocyanates* is based on an industrial hygiene approach that makes it easier, among other things, to identify, assess, and control risk factors associated with exposure to these substances. The document covers exposure via respiratory and skin pathways as well as other safety risks. It also discusses various means of prevention. Designed in part by IRSST occupational hygienist **Brigitte Roberge**, this user-friendly guide cites innumerable references and is written in plain

and simple language. It answers the most frequently asked questions about the health effects of isocyanates, personal protective equipment (PPE), ventilation, decontamination, product substitution, medical surveillance, worker training, and work practices and methods. One complete section is dedicated to examples specific to particular processes, thus familiarizing the user with the industrial hygiene approach and the related tools.



PLANNING TOOL FOR SAFE MANUAL HANDLING

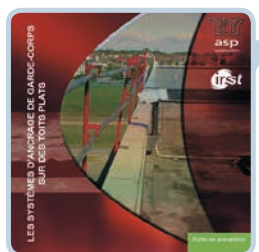


Manual handling of materials causes many accidents daily and accounts for nearly 30% of all employment injuries compensated by the CSST. Developed by researchers **Monique Lortie** of UQAM and **Marie St-Vincent** of the IRSST with the input of OHS practitioners to ensure ready usability, the *Planning*

Tool for Safe Manual Handling is designed to help workplaces manage musculoskeletal disorder risk prevention. This tool informs them of the nature and complexity of material handling situations so that they can plan appropriate changes and carry out training activities suited to their context.



LES SYSTÈMES D'ANCRAGE DE GARDE-CORPS SUR DES TOITS PLATS (ANCHORING SYSTEMS FOR GUARDRAILS ON FLAT ROOFS)



Developed in conjunction with ASP Construction and researcher **André Lan** of the IRSST, this prevention fact sheet provides the information needed to ensure that guardrail anchoring systems are properly and securely installed on flat roofs in order to eliminate the risk of falls. As a preliminary step, the researchers studied the three main anchoring systems used in Québec to assess whether they offered adequate

protection for workers and whether they met the withstand requirements of the *Safety Code for the Construction Industry*. By applying the directives compiled on this prevention fact sheet, workplaces can be sure of having safe guardrails and anchoring systems, particularly for roofers, who perform one of the most dangerous jobs of all because of the risk of falls from heights.



A WEB SITE ON THE PREVENTION OF INTERPERSONAL VIOLENCE IN THE WORKPLACE

The Web site on the prevention of interpersonal violence in the workplace, which is based on a practical proven approach derived from ten years of research, proposes a five-step process. Developed in collaboration with **Nathalie Jauvin** of the Recherche sur les interrelations personnelles, organisationnelles et sociales du travail (RIPOST) group, the Web site

proposes possible courses of action, suggestions, and tips, as well as downloadable tools to help in implementing prevention measures or enhance existing ones. Its content is such that the process can be adapted to any company's size and activity sector, whether or not a union is present.



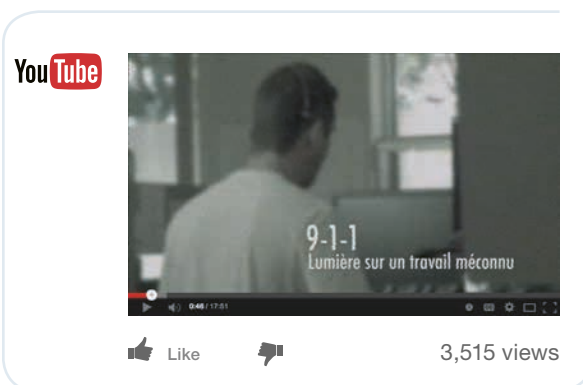
A WEBINAR ON ISOCYANATES

Entitled *Les isocyanates en milieu de travail – Évaluation et prévention*, the IRSST's very first webinar brought together around 100 people from all corners of Québec, but also from as far away as British Columbia, France, and Switzerland. Nearly two-thirds of the "attendees" came from the public OHS network and the remainder from the private

sector. The webinar included lectures interspersed with videos and surveys, as well as a question period. The responses received on a participant satisfaction survey indicated that the event, which was hosted by the IRSST's **Brigitte Roberge** and **Simon Aubin**, was a success, with a reported satisfaction rate of more than 90%.



A VIDEO: 9-1-1, LUMIÈRE SUR UN TRAVAIL MÉCONNU (911, SHEDDING LIGHT ON A LITTLE-KNOWN JOB)



Produced and broadcast for the first time in 2012 to help prevent psychological health problems among 911 emergency call centre agents, this video generated much interest and won over new audiences. First it was broadcast several times in Québec on *Canal Savoir*, which led the heads of the French television station TV Cristal to seek permission to broadcast it as well. The Québec-produced video was aired in France as part of the *Un coup d'œil sur...* program, which presents the best products aired by other television broadcasters worldwide.



A WEB SITE: STATISTIQUES SUR MESURE (CUSTOMIZED STATISTICS)

A pilot project involving a strategy aimed at leveraging the extensive work done by the IRSST's Statistical Surveillance Group was also carried out. This group produces and analyzes statistical indicators in order to support the Institute's strategic orientations and research programs. However, the format and content of a large proportion of these indicators, which could be useful to the Institute's partners, are not always adapted to suit their needs. The first topic explored in this project concerned the importance of taking gender into account in OHS studies. Presented in the form of video capsules and simplified fact sheets, the data were customized for four levels of users ranging from novice to expert.



RÉSEAU D'ÉCHANGES SUR LA MANUTENTION (REM) (MANUAL HANDLING EXCHANGE NETWORK)

A network coordinated jointly by the IRSST and CSST, REM held its seventh breakfast seminar on the topic of manual material handling and women. Participants learned how the latest research results in this area can positively impact their manual handling practices.

In addition, REM published two issues of an information newsletter during the year, bringing the latest research news, reading suggestions, and testimonials aimed specifically at helping companies manage the prevention of manual handling risks within easy reach of the 500 network members.



#

Laboratories

The Laboratory Division turned in a very good year, with an unprecedented number of environmental, toxicological, and microbiological analyses and a significant increase in the number of hours spent calibrating, maintaining, and repairing direct measurement and sampling instruments. The laboratories not only supported research but also improved their service offer, as evidenced by the following achievements:

Asbestos

The year 2013 saw the coming into force of amendments to Québec's *Regulation respecting occupational health and safety* and the *Safety Code for the construction industry* designed to improve the protection of persons performing work likely to produce asbestos dusts known to be carcinogenic. These amendments require the inspection of all buildings to locate asbestos-containing materials such as flocking and heat-insulating materials.

To support application of the Regulation, the Laboratory Division posted IRSST Analysis Method 244-3 online and developed a program for recognizing the quality of service providers that assess asbestos concentrations in bulk materials. A laboratory that undertakes to determine the percentage of asbestos in samples must participate in an interlaboratory quality control program to earn this recognition. By meeting the requirements of the IRSST's recognition program (QC VRAC), a laboratory that is selected as a service provider qualifies as proficient in characterizing asbestos fibres.

AIHA accreditation

With an essential role to play in supporting industrial hygiene research and handling requests for analyses from the CSST and its partner network, the Institute's laboratories offer high-calibre expertise reputed well beyond Québec's boundaries. This recognition is based on the calibre of their scientific and technical personnel and on the accreditations issued to the IRSST by Canadian and American organizations. These accreditations in turn provide our partners and clients with a guarantee of the quality and integrity of our work.

IRSST The IRSST attends the AIHA conference

Presentation at the Palais des congrès

www.irsst.qc.ca May 20, 2013 –

Our colleagues Jacques Lesage and Sebastien Gagné presented the different services and products of the IRSST's laboratories at the AIHA conference.



Like · Comment · Share

In 2013, the Institute's laboratories worked hard to have their accreditations from the American Industrial Hygiene Association (AIHA) renewed and to expand the scope of their accreditation in the field of microbiology. The AIHA saw fit to renew our laboratories' certificates in both organic chemistry (solvents and isocyanates) and inorganic chemistry (metals, silica, and asbestos).

The IRSST thus continued its efforts and succeeded in obtaining broader accreditation in microbiology, which now includes the analysis of *Legionella* bacteria. In fact, our laboratories' expertise was enlisted to support interventions during the 2012 legionellosis outbreak in Québec City.

New analytical methods

The Laboratory Division does more than respond to requests for environmental, toxicological, and microbiological analyses from its clients and partners. Since their creation in 1980, the Division's laboratories have also earned recognition for the analytical methods they have developed and the support they lend to research. They have developed hundreds of these methods, some of which are then adopted as benchmarks by other laboratories. In 2013, the Laboratory Division's work led to publication of two new analytical methods, which now enhance its service offer:

- Beauparlant, M. *Caractérisation des fibres dans les poussières déposées ou dans les matériaux en vrac* (characterization of fibres in deposited dusts and bulk materials), Méthodes analytiques / MA-244-3, Montréal, IRSST, 2013, 22 p.
- Marchand, G. *Détection et identification des bactéries du genre Legionella* (detection and identification of Legionella bacteria), Méthodes analytiques / MA-370, Montréal, IRSST, 2013, 19 p.

Distinctions

Joannie Martin, of the Laboratory Division, won the 2013–2014 Camille-Sandorfy doctoral scholarship. Awarded by the Université de Montréal's Chemistry Department, this scholarship recognized the excellence of her work in the field of inorganic chemistry. Ms. Martin is continuing her doctoral studies on the development of a new approach for improving the identification and quantification of airborne asbestos fibres and those contained in bulk materials.



#

Communication

Communications and public affairs activities convey the IRSST's image and promote its achievements, thereby shaping the Institute's reputation and enhancing its visibility. Numerous means are used to support the organization and leverage its production. These include the main Web site and its offshoot Web sites, blogs, the electronic newsletter *InfoIRSST* and its 16,000 subscribers, the magazine *Prévention au travail* with a circulation of 27,300, media relations, sponsorships, research report publications, video productions, and a presence on the social media and at a variety of events.



PRESENT AT AIHce

It was IRSST president and CEO **Marie Larue** who, at the invitation of the industrial hygienist community of Québec and Canada, kicked off the 74th annual American Industrial Hygiene Conference and Exposition (AIHce). Running under the theme *The Art and Science of Professional Judgment*, this important gathering drew over 3,000 occupational and environmental health and safety (OEHS)

professionals from 40 countries to Montréal. Events such as this provide an overview of the latest developments in knowledge and fuel productive exchanges among professionals. The Institute also took this opportunity to launch the French and English versions of the second edition of its *Guide for Safe Use of Isocyanates – An Industrial Hygiene Approach*.



PRESENT AT HIGHTEX

Expo Hightex 2013 opened in Montréal under the honorary chairmanship of IRSST president and CEO **Marie Larue**. Billed as the “annual knowledge and business rendez-vous of Canadian textiles, advanced materials, and geosynthetics experts,” Expo Hightex

featured two themes: worker and environmental protection. The IRSST has been partnering with the event organizer, CTT Group, for a number of years, and as such, hosted a work session on the latest innovations in protective equipment.



THE IRSST'S 2013 INSTITUTIONAL COLLOQUIUM

The International Year of Statistics left its mark on the program of the IRSST'S annual colloquium, which was held in Montréal in November and attended by nearly 200 people. The theme retained, *Les statistiques au service de la recherche en SST* (statistics serving OHS research) helped, among other things, to leverage and promote the work of the Institute's Statistical

Surveillance Group, but above all to shine the spotlight on several existing sources of data in Québec. Some of these sources are little known, while others are little used or not used at all, yet their potential in terms of developing OHS research was deemed irrefutable by attendees.



Marie Larue, Christian Léger, Isabelle Leroux, Jacques Perron, Paul-Émile Boileau, Patrice Duguay, Charles Gagné, Élise Ledoux, François Hébert



The members of ISO/TC 108/SC 4 (International Organization for Standardization/Technical Committee 108/Subcommittee 4)



VISITORS

Every year, through their membership in various national and international committees, the IRSST's scientists contribute to the creation and updating of occupational health and safety standards and regulations. In addition, the Institute sometimes welcomes to its premises visiting scientists who develop standards and other reference documents in a variety of fields. In 2013, it hosted two important meetings held simultaneously: that of a subcommittee of an ISO (International Organization for Standardization) technical committee, namely **ISO/TC 108/SC 4** on human exposure to mechanical vibration and shock, and that of the European Committee for Standardization's technical committee **CEN/TC 231** on mechanical vibration and shock.

Around 40 individuals from nine countries participated in the committees of experts. Some of the topics discussed at these committee meetings were whole body vibration, hand-arm vibration, vibrotactile perception, biodynamic modelling, and anti-vibration seats and gloves.

The IRSST also welcomed the members of **CSA Group's Technical Committee Z94.4**. The aim of this Canadian committee's meeting was to revise and improve CAN/CSA Standard Z94.4 on respiratory protection, which was published in 2011. The roughly 30 participating researchers and experts agreed to form a sub-working group.

In addition to providing an ideal occasion for scientific networking with some of the world's leading experts, the fact of hosting these committees allowed IRSST personnel to put their knowledge to use for the international community.



GREATER VISIBILITY IN THE FIELD THAN EVER BEFORE

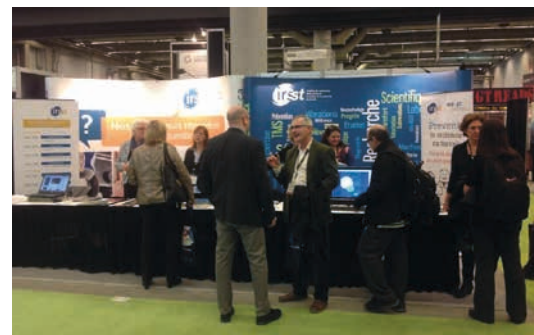
To better publicize its scientific and technical production, the IRSST used its exhibition stand to promote direct contacts and exchanges with its clients and partners. In 2013, it was present at nine events.

1. The Forum santé et sécurité du travail
2. The annual conference of the Association québécoise pour l'hygiène, la santé et la sécurité du travail
3. The 1^{er} Rassemblement pour la santé et le mieux-être en entreprise
4. The American Industrial Hygiene Conference and Exposition
5. The annual colloquium of the Ordre des ergothérapeutes du Québec
6. The 26th Annual Scientific Conference of the Occupational and Environmental Medical Association of Canada
7. The 4^e Grande rencontre du Centre de liaison sur l'intervention et la prévention psychosociales
8. The Congrès international francophone en ressources humaines
9. The Grand Rendez-vous SST

IRSST The IRSST present at the Grand Rendez-vous

Our researchers answer your questions

www.irsst.qc.ca November 6, 2013 – Drop by to see us at our booth. Material handling, noise, workplace violence, isocyanates... Our researchers will be there to answer your questions!



Like · Comment · Share



VIDEOS

Multimedia productions enrich the Institute's document collection, which includes some 100 downloadable videos in addition to the many available reports and documents. The video entitled *9-1-1 – Lumière sur un travail méconnu* remained the most popular production among Web users, with over 5,000 viewings. In total, the Institute's audiovisual documents were viewed 24,000 times on IRSST.TV.



Most Popular Publications in 2013

In French

1. *Guide pour soutenir le retour au travail et favoriser le maintien en emploi – Faciliter le retour au travail d'un employé à la suite d'une absence liée à un problème de santé psychologique*, RG-758, Louise St-Arnaud, Mariève Pelletier.
2. *Guide d'échantillonnage des contaminants de l'air en milieu de travail (version 8.1)*, T-06, Daniel Drolet, Guylaine Beauchamp.
3. *Y a-t-il des cancérogènes dans votre milieu de travail? Passez à l'action!*, RG-790, France Labrèche, Brigitte Roberge, Sabrina Gravel, Marie-France d'Amours.
4. *Guide de prévention pour une utilisation sécuritaire des isocyanates – Démarche d'hygiène du travail*, RG-764, Brigitte Roberge, Simon Aubin, Claude Ostiguy, Jacques Lesage.
5. *Les TMS des membres supérieurs – Mieux les comprendre pour mieux les prévenir*, RG-779, Serge Simoneau, Marie St-Vincent, Denise Chicoine.
6. *Outil d'aide à la planification pour une manutention manuelle sécuritaire*, RF-782, Monique Lortie, Marie St-Vincent.
7. *Enquête québécoise sur des conditions de travail, d'emploi et de SST (EQCOTESST)*, Michel Vézina, Esther Cloutier, Susan Stock, Katherine Lippel, Éric Fortin, Alain Delisle, Marie St-Vincent, Amélie Funes, Patrice Duguay, Samuel Vézina, Pascale Prud'homme.
8. *Lésions professionnelles indemnisées au Québec en 2005-2007: Profil statistique par industrie – catégorie professionnelle*, R-749, Patrice Duguay, Alexandre Boucher, Marc-Antoine Busque, Pascale Prud'homme, Daniel Vergara.
9. *Interventions pour la prévention des TMS – Mesure de l'exposition aux facteurs de risque et aspects économiques*, R-780, Daniel Imbeau, Marie-Ève Chiasson, Romain Jallon, Bruno Farbos, Karine Aubry, Nathalie de Marcellis-Warin, Marie St-Vincent.
10. *Les coûts des lésions professionnelles au Québec, 2005-2007*, R-769, Martin Lebeau, Patrice Duguay, Alexandre Boucher.

In English

1. *Guide for Safe Use of Isocyanates – An Industrial Hygiene Approach*, RG-773, Brigitte Roberge, Simon Aubin, Claude Ostiguy, Jacques Lesage.
2. *Construction Workers' Exposure to Crystalline Silica – Literature Review and Analysis*, R-771, Charles Beaudry, Chantal Dion, Michel Gérin, Guy Perrault, Denis Bégin, Jérôme Lavoué.
3. *Are there carcinogens in your workplace? It's time to act!*, RG-796, France Labrèche, Brigitte Roberge, Sabrina Gravel, Marie-France d'Amours.
4. *Development of a Method of Measuring Nanoparticle Penetration through Protective Glove Materials under Conditions Simulating Workplace Use*, R-785, Patricia Dolez, Ludwig Vinches, Gérald Perron, Toan Vu-Khanh, Philippe Plamondon, Gilles L'Espérance, Kevin Wilkinson, Yves Cloutier, Chantal Dion, Ginette Truchon.
5. *Participatory Training in Manual Handling – Theoretical Foundations and Proposed Approach*, R-784, Denys Denis, Monique Lortie, Marie St-Vincent, Maud Gonella, André Plamondon, Alain Delisle, Jacques Tardif.
6. *Development of a Procedure to Measure the Effectiveness of N95 Respirator Filters against Nanoparticles*, R-754, Fariborz Haghighat, Ali Bahloul, Jaime Lara, Reza Mostofi, Alireza Mahdavi.
7. *Characterization of Dusts in Traditional Bakeries*, R-760, Brigitte Roberge, Simon Aubin, Yves Cloutier.
8. *Horizontal Plastic Injection Molding Machine – Safety Checklist*, RG-687, Sabrina Jocelyn, Serge Massé, Christian Sirard.
9. *Characterization of Dusts in the Food Seasonings Sector*, R-761, Brigitte Roberge, Simon Aubin, Yves Cloutier.
10. *Characterization and Control of Occupational Exposure to Nanoparticles and Ultrafine Particles*, R-777, Maximilien Debia, Charles Beaudry, Scott Weichenthal, Robert Tardif, André Dufresne.

#

Sustainable Development

The Institute voluntarily adopted a new sustainable development strategy for the 2013–2017 period, which coincides with the duration of its five-year scientific and technical production plan. This strategy includes a **new objective**, that of being responsive to demographic changes.

Drawing inspiration from the Québec government's sustainable development principles and applying them to its activities, the IRSST reiterated its ongoing commitment to this collective effort, above all by carrying out its mission, which fits in perfectly with this philosophy of environmental responsibility and addresses one of the issues targeted in the government strategy, namely that of enhancing knowledge.

The Institute undertook various sustainable development activities. First, it developed a guide to the organization of environmentally friendly events and a policy on asset management disposal, both of which were subsequently presented to and adopted by the Executive Committee. Concrete environmentally friendly steps were also taken when the Institute's photocopy machines, which were nearing the end of their useful life, were replaced.

In terms of raising awareness and disseminating information, 10 columns were published in the IRSST personnel's online newsletter.

#

Human Resources Dedicated to Research

Human resources are the heartbeat of the Institute and its most valuable asset. As at December 31, 2013, the IRSST had **151 employees**, whose average age was 47. Scientific personnel made up two-thirds of this number, including some 100 technicians, professionals, and researchers. During the course of the year, the Human Resources Department recruited seven permanent employees, two of them at the management level: **Sylvain Pelletier**, director of the Mechanical and Physical Risk Prevention team, and **Martine Poulin**, director of the OHS Problem Prevention and Rehabilitation team. Nine employees were hired on a temporary basis to support activities, and 36 trainees, of whom 25 were new, were actively involved.





OCCUPATIONAL HEALTH AND SAFETY

Leading by example, the Institute has a volunteer-run health and safety committee (HSC) that oversees employees' well-being in terms of occupational injury prevention. In 2013, the HSC held nine meetings. Seven accidents or incidents, three of which required an investigation, were reported.

The HSC developed a verification procedure for prototypes made by IRSST personnel, as one of its accomplishments in 2013. The committee also collaborated in three ergonomic evaluations conducted by the Institute, introduced an online training program on the Workplace Hazardous Materials Information System (WHMIS), and carried out work in two of the Institute's laboratories to improve ergonomics and reduce the risk of musculoskeletal disorders.



DISTINCTIONS FOR AN EXTERNAL RESEARCHER

As both a research centre and funding organization, the IRSST plays a part in the creation and maintenance of a network of external researchers by funding their OHS work. The invaluable contribution made by these specialists is greatly appreciated. They run their own projects or carry them out jointly with scientists from our Institute. Some receive a wide array of honours and distinctions.

In 2013, the IRSST honoured the excellence of researcher **Martin Lauzier**, scientific director of the Centre for Studies and Research in Industrial Psychology and Organizational Behavior (CERPICO), who became the first Canadian recipient of the first-place 2013 Distinguished Dissertation Award from the prestigious International Society for Performance Improvement (ISPI).





Governance

The composition of the Institute's governing bodies varied during the year, with several departures and appointments. On behalf of all IRSST personnel, the president and CEO would like to welcome and congratulate the new arrivals by offering them all the cooperation they need to perform their mandates. She also wishes to express her great appreciation to Michel Arsenault, who left his position on the Board of Directors, and to Germain Gaudreault, Edwin Bourget, and Camille Limoges for their contributions to the work of the Scientific Advisory Board.

Board of Directors

The Board of Directors determines the IRSST's orientations, development framework, and financing. It is a labour/management body composed of the chair and seven representatives each of employer and worker associations.

In 2013, the members of the Board of Directors held eight meetings, while those of the Executive Committee met seven times.

CHAIR

Michel Després*

EMPLOYER REPRESENTATIVES

Françoise Bertrand
Yves-Thomas Dorval*
France Dupéré
Martine Hébert
Patricia Jean
Carmel Laflamme
Simon Prévost

WORKER REPRESENTATIVES

Michel Arsenault*
Andrée Bouchard
Claude Faucher
Jean Lacharité
Lucie Levasseur
Yves Ouellet
Daniel Roy

OBSERVER (FROM THE MINISTÈRE DU TRAVAIL DU QUÉBEC)

Suzanne Thérien

IRSST REPRESENTATIVE

Marie Larue

DEPARTURE

Michel Arsenault*

* Member of the Executive Committee

Scientific Advisory Board

A tri-partite advisory body serving the president and CEO, the Scientific Advisory Board (SAB) judges the relevance, priority, and scientific merit of internal and external research programs and projects. The SAB is composed of the Institute's president and CEO, six members of the scientific and technical communities, four worker representatives, and four employer representatives.

In 2013, the members of the SAB met nine times, including once at a special meeting.

CHAIR

Marie Larue

EMPLOYER REPRESENTATIVES

Lionel Bernier
Germain Gaudreault
Dominique Malo
Marie-France Turcotte

WORKER REPRESENTATIVES

Micheline Boucher
Jean Dussault
Daniel Flynn
Denis Mailloux

MEMBERS OF THE SCIENTIFIC AND TECHNICAL COMMUNITIES

Léonard Aucoin
Edwin Bourget
Pierre Galarneau
Camille Limoges
Alain Rondeau
Yves Rousseau

OBSERVER (FROM THE CSST)

Claude Sicard

APPOINTMENTS

Léonard Aucoin
Edwin Bourget

RENEWAL

Denis Mailloux

DEPARTURES

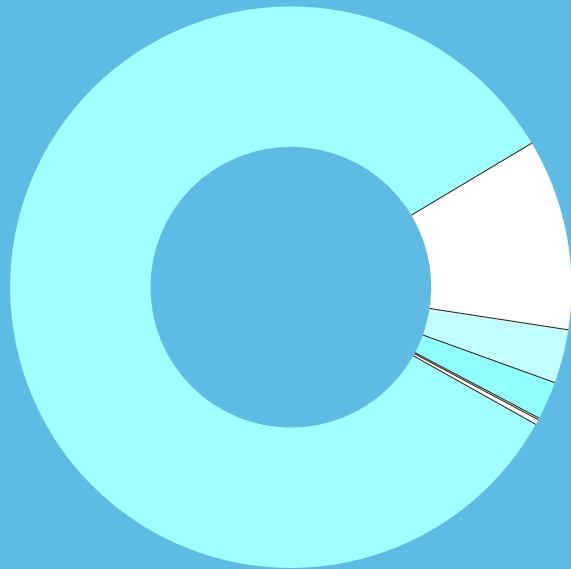
Edwin Bourget, Germain Gaudreault, Camille Limoges

#

Research Funding

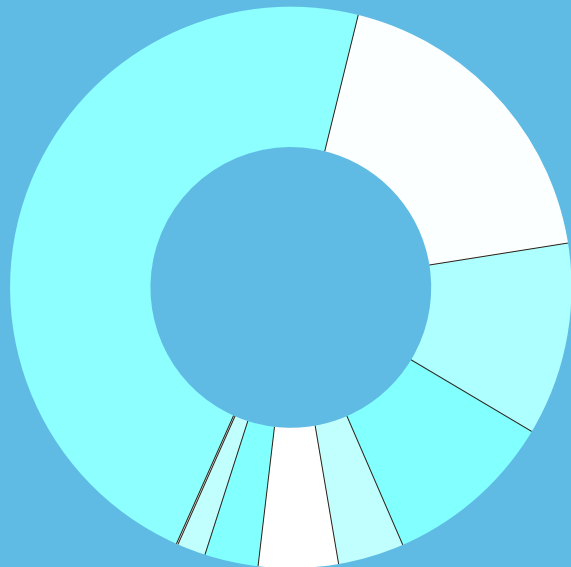
Revenues: \$25,334,176

CSST	83.3%
Laboratory services	11.0%
Special projects	3.1%
Contracts	2.2%
Beryllium project	0.1%
Other	0.3%
	<hr/>
	100%



Expenditures: \$25,524,032

Internal research	47.2%
External research	18.6%
Laboratory services	11.1%
Finance and administration	9.9%
Communications	3.8%
Management	4.6%
Contracts	3.1%
Special projects	1.6%
Beryllium project	0.1%
	<hr/>
	100%



- ↑ RESEARCH ACTIVITIES
- ↑ IRSST PUBLICATIONS
- ↑ SCIENTIFIC PUBLICATIONS

Because prevention
in the workplace
is vital!



Appendix - Activity Report 2013

About 249,000 results (0.32 second)

IRSST

www.irsst.qc.ca/en/home.html ▾

The IRSST, established in Québec since 1980, is a scientific research organization known for the quality of its work and the expertise of its personnel ...

IRSST

Find a publication – Laboratory
Services – Directory – Scholarships

Calculation of the Rm

Exposure to mixtures of chemical
substances in the workplace ...

This brochure lists, by research field, all the projects carried out or funded by the IRSST for which work began during the year. It also includes new scientific publications, peer-reviewed journal articles, and other materials published in 2013.



RESEARCH ACTIVITIES

In 2013, the **188** active projects included **39** new projects that began during the year. The research activity portfolio is divided among the IRSST's four research fields:

- Chemical and Biological Hazard Prevention
- Mechanical and Physical Risk Prevention
- Sustainable Prevention and Work Environment
- Occupational Rehabilitation



IRSST PUBLICATIONS

In 2013, the IRSST's document collection grew by **47** publications and **two** new laboratory methods. These latest contributions of the Institute's research and expertise to the advancement of occupational health and safety knowledge took several forms, including research reports, technical fact sheets, and practical guides.



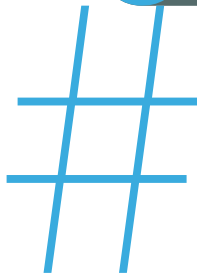
SCIENTIFIC PUBLICATIONS

In 2013, projects carried out or funded by the IRSST gave rise to **80** peer-reviewed scientific publications, as follows:

- **58** peer-reviewed journal articles
- **13** peer-reviewed conference papers
- **9** other publications, including books, book chapters, master's theses, and doctoral dissertations.



TABLE OF CONTENTS



Chemical and Biological Hazard Prevention	4
Mechanical and Physical Risk Prevention	12
Sustainable Prevention and Work Environment	16
Occupational Rehabilitation	22
Special Projects	26



CHEMICAL AND BIOLOGICAL HAZARDS PREVENTION



STUDIES THAT FALL UNDER THE CHEMICAL AND BIOLOGICAL HAZARD PREVENTION RESEARCH FIELD HAVE THREE MAIN ORIENTATIONS:

- 1. Development of strategies and methods for evaluating exposure and estimating health risks using toxicological and epidemiological approaches**
- 2. Development and validation of technologies and tools designed to reduce and control exposure**
- 3. Development of methods for sampling and analyzing chemical substances and biological agents**



THIS FIELD LAUNCHED TWELVE NEW PROJECTS IN 2013:

Characterization and control of the silica dust emitted by the dry and wet polishing operation in the granite and other quartz-containing-materials processing sector, Ali Bahloul, Victor Songmene, Marcelo Reggio.

Evaluation of bioaerosols and gaseous compounds in agri-food and residential organic waste composting, Geneviève Marchand, Yves Cloutier, Jacques Lavoie, Caroline Duchaine, Yves Bernard.

Preventing chemical hazards related to pesticide use by Québec apple growers. The current situation and recommended actions for improving personal protection, Ludovic Tudori, Danièle Champoux, Michèle Bouchard, Caroline Jolly.

Activation of human eosinophils by nanoparticles, Denis Girard.

Workplace substitution of solvents. Process-based approach and updating of the Solub site, Michel Gérin, Maximilien Debia.

#2013

The development and validation of methods for sampling and characterizing engineered nanomaterials in air and on workplace surfaces, Maximilien Debia, Claude Ostiguy, Gilles L'Espérance, André Dufresne.

Measuring the efficacy of protective gloves against nanoparticles in conditions simulating their use in the workplace, Nathalie Tufenkhi, Stéphane Hallé, Kevin Wilkinson.

Development and validation of universal NanoBadge (uNanoBadge) prototypes for evaluating pulmonary and skin exposure to manufactured nanoparticles, Karim Maghni, Yves Cloutier, Lyes Tabet, Kevin Wilkinson, L'Hocine Yahia.

Overview of the quality control program for fibre counting – 1992 to 2011, Chantal Dion, Daniel Drolet.

Exploratory study on the impact of various treatment systems on the level of chlorination by-products in swimming pools, Robert Tardif, Manuel Rodriguez, Cyril Catto.

Development of a new device for the effective and safe sampling of methylene diphenyl diisocyanate (MDI) aerosols, Sébastien Gagné, Simon Aubin, Huu Van Tra.

Québec workers' exposure to carcinogens: industries and occupational groups, France Labrèche, Patrice Duguay, Marc-Antoine Busque, Brigitte Roberge.



CHEMICAL AND BIOLOGICAL HAZARDS PREVENTION



THE RESEARCH WORK CARRIED OUT IN THIS FIELD YIELDED 10 REPORTS (INCLUDING FOUR ENGLISH TRANSLATIONS), EIGHT GUIDES (INCLUDING FOUR ENGLISH TRANSLATIONS), AND TWO FACT SHEETS (INCLUDING ONE ENGLISH TRANSLATION).

BEAUDRY C., DION C., GÉRIN M., PERRAULT G., BÉGIN D., LAVOUÉ J. *Construction Workers' Exposure to Crystalline Silica – Literature Review and Analysis*, Studies and Research Projects / Report R-771, Montréal, IRSST, 2013, 108 p.

BEUPARLANT M. *Caractérisation des fibres dans les poussières déposées ou dans les matériaux en vrac*, Méthodes analytiques / MA-244-3, Montréal, IRSST, 2013, 22 p.

CÔTÉ J., LEMAY F., VYSKOCIL A., BARIL M., DROLET D., EL MAJIDI N., GAGNON F., VIAU C. *Outil de calcul de l'indice d'exposition mixte aiguë (IEMA) d'un mélange de substances – Guide d'utilisation*, Études et recherches / Guide technique RG-770, Montréal, IRSST, 2013, 22 p.

CÔTÉ J., LEMAY F., VYSKOCIL A., BARIL M., DROLET D., EL MAJIDI N., GAGNON F., VIAU C. *Les effets additifs potentiels associés à des expositions aiguës par inhalation de mélanges de substances chimiques – Outil d'aide à la gestion des situations d'urgence*, Études et recherches / Rapport R-770, Montréal, IRSST, 2013, 39 p.

DEBIA M., BEAUDRY C., WEICHTHAL S., TARDIF R., DUFRESNE A. *Characterization and Control of Occupational Exposure to Nanoparticles and Ultrafine Particles*, Studies and Research Projects / Report R-777, Montréal, IRSST, 2013, 66 p.

DROLET D., BEAUCHAMP G. *Sampling Guide for Air Contaminants in the Workplace – 8th edition, version 8.1 updated*, Studies and Research Projects / Technical Guide T-15, Montréal, IRSST, 2000, 2013, 152 p.

FATISSON J., HALLÉ S., NADEAU S., VIAU C., CAMUS M., ATEME-NGUEMA B., CLOUTIER Y. *Nanoparticules synthétiques – Gestion adaptative des risques à la santé et à la sécurité des travailleurs*, Études et recherches / Rapport R-798, Montréal, IRSST, 2013, 55 p.

HAGHIGHAT F., BAHLOUL A., LARA J., MOSTOFI R., MAHDAVI A. *Développement d'une procédure de mesure de l'efficacité des filtres d'appareils de protection respiratoire N95 contre les nanoparticules*, Études et recherches / Rapport R-776, Montréal, IRSST, 2013, 77 p.

LABRÈCHE F., ROBERGE B., GRAVEL S., D'AMOURS M.-F. *Feuillet – Les cancérogènes en milieu de travail*, Études et recherches / Résumé RR-790, Montréal, IRSST, 2013, 2 p.

LABRÈCHE F., ROBERGE B., GRAVEL S., D'AMOURS M.-F. *Fact Sheet – Carcinogens in workplaces*, Studies and Research Projects / Summary RR-796, Montréal, IRSST, 2013, 2 p.

LABRÈCHE F., ROBERGE B., GRAVEL S., D'AMOURS M.-F. *Y a-t-il des cancérogènes dans votre milieu de travail? Passez à l'action!*, Études et recherches / Guide RG-790, Montréal, IRSST, 2013, 14 p.

LABRÈCHE F., ROBERGE B., GRAVEL S., D'AMOURS M.-F. *Are there carcinogens in your workplace? It's time to act!*, Studies and Research Projects / Guide RG-796, Montréal, IRSST, 2013, 14 p.

LAVOIE J., NEESHAM-GRENON E., DEBIA M., CLOUTIER Y., MARCHAND G. *Development of a Control Banding Method for Selecting Respiratory Protection Against Bioaerosols*, Studies and Research Projects / Report R-804, Montréal, IRSST, 2013, 57 p.

LAVOIE J., NEESHAM-GRENON E., DEBIA M., CLOUTIER Y., MARCHAND G. *Développement d'un modèle de gestion graduée du risque pour le choix de la protection respiratoire contre les bioaérosols*, Études et recherches / Rapport R-766, Montréal, IRSST, 2013, 57 p.

MARCHAND G. *Détection et identification des bactéries du genre Legionella*, Méthodes analytiques / MA-370, Montréal, IRSST, 2013, 19 p.

ROBERGE B., AUBIN S., OSTIGUY C., LESAGE J. *Guide for Safe Use of Isocyanates – An Industrial Hygiene Approach*, Studies and Research Projects / Technical Guide RG-773, Montréal, IRSST, 2013, 94 p.

ROBERGE B., AUBIN S., OSTIGUY C., LESAGE J. *Guide de prévention pour une utilisation sécuritaire des isocyanates – Démarche d'hygiène du travail*, Études et recherches / Guide technique RG-764, Montréal, IRSST, 2013, 94 p.

ROBERGE B., TEASDALE B. *Polyurethane Foam Spraying – Good Practices Guide, 2nd edition*, Guide RG-632, Montréal, IRSST / Montréal, ASP Construction, 2013, 34 p.

ROBERGE B., TEASDALE B. *La pulvérisation de mousse de polyuréthane – Guide de bonnes pratiques, 2^e édition*, Guide RG-623, Montréal, IRSST / Montréal, ASP Construction, 2013, 36 p.

SAUVÉ J.-F., BEAUDRY C., BÉGIN D., DION C., GÉRIN M., LAVOUÉ J. *Construction Workers' Crystalline Silica Exposure – Statistical Analysis of a Literature-Based Database*, Studies and Research Projects / Report R-801, Montréal, IRSST, 2013, 81 p.

SAUVÉ J.-F., BEAUDRY C., BÉGIN D., DION C., GÉRIN M., LAVOUÉ J. *Exposition des travailleurs de la construction à la silice cristalline – Exploitation d'une banque de données tirée de la littérature*, Études et recherches / Rapport R-772, Montréal, IRSST, 2013, 81 p.

TRUCHON G., ZAYED J., BOURBONNAIS R., LÉVESQUE M., DELAND M., BUSQUE M.-A., DUGUAY P. *Contraintes thermiques et substances chimiques – Bilan des connaissances et emplois les plus à risque au Québec*, Études et recherches / Rapport R-799, Montréal, IRSST, 2013, 60 p.



CHEMICAL AND BIOLOGICAL HAZARDS PREVENTION



THE RESEARCH WORK CARRIED OUT IN THIS FIELD GAVE RISE TO THE PUBLICATION OF 30 SCIENTIFIC PUBLICATIONS.

Peer-reviewed journal articles

ABDEL RAHMAN A. M., KAMATH S. D., GAGNÉ S., LOPATA A. L., HELLEUR R. *A comprehensive proteomics approach in characterizing and quantifying allergenic proteins from Northern Shrimp – Towards better occupational asthma prevention.* Journal of Proteome Research, Vol. 12, No. 2, 2013, p. 647-656.

ADIB G., LABRÈCHE F., DE GUIRE L., DION C., DUFRESNE A. *Short, fine and WHO asbestos fibers in the lungs of Quebec workers with an asbestos-related disease.* American Journal of Industrial Medicine, Vol. 56, No. 9, 2013, p. 1001-1014.

BABIN K., ANTOINE F., GONÇALVES D. M., GIRARD D. *TiO₂, CeO₂ and ZnO nanoparticles and modulation of the degranulation process in human neutrophils.* Toxicology Letters, Vol. 221, No. 1, 2013, p. 57-63.

BEAUDRY C., LAVOUÉ J., SAUVÉ J. F., BÉGIN D., SENHAJI RHAZI M., PERRAULT G., DION C., GÉRIN M. *Occupational exposure to silica in construction workers: a literature based exposure database.* Journal of Occupational and Environmental Hygiene, Vol. 10, No. 2, 2013, p. 71-77.

BOURBONNAIS R., ZAYED J., LÉVESQUE M., BUSQUE M.-A., DUGUAY P., TRUCHON G. *Identification of workers exposed concomitantly to heat stress and chemicals.* Industrial Health, Vol. 51, No. 1, 2013, p. 25-33.

DJEBARA A., ZEDAN Y., KOUAM J., SONGMENE V. *The effect of the heat treatment on the dust emission during machining of an Al-7Si-Mg cast alloys.* Journal of Materials Engineering and Performance, Vol. 22, No. 12, 2013, p. 3840-3853.

DJEBARA A., SONGMENE V., BAHLOUL A. *Effects of machining conditions on specific surface of PM_{2.5} emitted during metal cutting.* Health, Vol. 5, No. 10A2, 2013, p. 36-43.

DOLEZ P., CLOUTIER Y., NOËL A., TABEL L., GAUTRIN D., DEBIA M., L'ESPÉRANCE G., HALLÉ S., BAHLOUL A., VINCHES L. *Advancement in Quebec research on the prevention of risks related to occupational exposure to nanomaterials.* Relations industrielles/ Industrial Relations, Vol. 68, No. 4, 2013, p. 623-642.

DUQUENNE P., MARCHAND G., DUCHAINE C.
Measurement of endotoxins in bioaerosols at workplace : a critical review of literature and a standardization issue. Annals of Occupational Hygiene, Vol. 57, No. 2, 2013, p. 137-172.

FATISSON J., HALLÉ S., NADEAU S., VIAU C., CAMUS M., CLOUTIER Y. *A pilot study towards ranking occupational health risk factors emanating from engineered nanoparticles: review of a decade of literature.* International Journal of Safety and Security Engineering, Vol. 3, No. 4, 2013, p. 261-264.

GAGNÉ S. *Determination of trans, trans-muconic acid in workers' urine through ultra-performance liquid chromatography coupled to tandem mass spectrometry.* Biomedical Chromatography, Vol. 27, No. 5, 2013, p. 664-668.

GAGNÉ S. *Achieving greater selectivity for the analysis of o-, m-, p-methylhippuric acids in workers' urine by ultra performance liquid chromatography coupled with tandem mass spectrometry.* Journal of Chromatography B, Vol. 931, 2013, p. 42-49.

HAJRA B., STATHOPOULOS T., BAHLOUL A.
A wind tunnel study of the effects of adjacent buildings on near-field pollutant dispersion from rooftop emissions in an urban environment. Journal of Wind Engineering and Industrial Aerodynamics, Vol. 119, 2013, p. 133-145.

KAMGUEM R., DJEBARA A., SONGMENE V.
Investigation on surface finish and metallic particle emission during machining of aluminum alloys using response surface methodology and desirability functions. The International Journal of Advanced Manufacturing Technology, Vol. 69, No. 5-8, 2013, p. 1283-1298.

KOUAM J., SONGMENE V., ZEDAN Y., DJEBARA A., KHETTABI R. *On chip formation during drilling of cast aluminum alloys.* Machining Science and Technology : An International Journal, Vol. 17, No. 2, 2013, p. 228-245.

KOUAM J., SONGMENE V., BAHLOUL A. *Experimental investigation on PM_{2.5} particle emission during polishing of granite.* Health, Vol. 5, No. 10A2, 2013, p. 29-35.

LABRÈCHE F., DUGUAY P., OSTIGUY C., BOUCHER A., ROBERGE B., PETERS C. E., DEMERS P. A. *Estimating occupational exposure to carcinogens in Quebec.* American Journal of Industrial Medicine, Vol. 56, No. 9, 2013, p. 1040-1050.



CHEMICAL AND BIOLOGICAL HAZARDS PREVENTION



LAVOIE J. *Protection respiratoire contre les aérosols biologiques (bioaérosols)*. Bulletin de veille scientifique, No. 22, 2013, p. 37-41.

LAVOIE J. *Risques pour la santé des personnes travaillant dans des bâtiments humides et moisiss.* Bulletin de veille scientifique, No. 21, 2013, p. 36-40.

MAHDAVI A., BAHLOUL A., HAGHIGHAT F., OSTIGUY C. *Contribution of breathing frequency and inhalation flow rate on performance of N95 filtering facepiece respirators*. Annals of Occupational Hygiene, 2013, doi:10.1093/annhyg/met051, (October 22).

NEESHAM-GRENON E., LAVOIE J., CLOUTIER Y., MARCHAND G., DEBIA M. *Bioprotect tool: a control banding method for respirator selection against bioaerosols*. Journal of the International Society for Respiratory Protection, Vol. 30, No. 1, 2013, p. 41-52.

NOËL A., CHARBONNEAU M., CLOUTIER Y., TARDIF R., TRUCHON G. *Rat pulmonary responses to inhaled nano-TiO₂: effect of primary particle size and agglomeration state*. Particle and Fiber Toxicology, Vol. 10, article 48, 2013, 18 p.

NOËL A., L'ESPÉRANCE G., CLOUTIER Y., PLAMONDON P., BOUCHER J., PHILIPPE S., DION C., TRUCHON G., ZAYED J. *Assessment of the contribution of electron microscopy to nanoparticle characterization sampled with three cascade impactors*. Journal of Occupational and Environmental Hygiene, Vol. 10, No. 3, 2013, p. 155-172.

NOËL A., CLOUTIER Y., WILKINSON K. J., DION C., HALLÉ S., MAGHNI K., TARDIF R., TRUCHON G. *Generating nano-aerosols from TiO₂ (5 nm) nanoparticles showing different agglomeration states. Application to toxicological studies*. Journal of Occupational and Environmental Hygiene, Vol. 10, No. 2, 2013, p. 86-96.

SAUVÉ J.-F., BEAUDRY C., BÉGIN D., DION C., GÉRIN M., LAVOUÉ J. *Silica exposure during construction activities: statistical modeling of task-based measurements from the literature*. Annals of Occupational Hygiene, Vol. 57, No. 4, 2013, p. 432-443.

TRUCHON G., TARDIF R., CHAREST-TARDIF G., DE BATZ A., DROZ P.-O. *Evaluation of occupational exposure: comparison of biological and environmental variabilities using physiologically based toxicokinetic modeling*. International Archives of Occupational and Environmental Health, Vol. 86, No. 2, 2013, p. 157-165.

Peer-reviewed conference papers

DJEBARA A., SONGMENE V. *Dry machining of aluminum alloys and air quality*. in Proceedings of the 37th International MATADOR Conference, (37th : July 25-27, 2012 : Manchester, UK), Hinduja, S., Li, L. (eds), Springer, 2013, p. 135-139.

DJEBARA A., JOMAA W., BAHLOUL A., SONGMENE V. *Dust emission during dry machining of aeronautic aluminum alloys*. in Proceedings of the 1st International Conference on aeronautics Sciences / ICAS, (1ST : MAY 27-28, 2013 : ORAN, ALGERIA), 2013, P. 40-47.

EMOND C., KOUASSI S., SCHUSTER F. *Development of an integrative program of nanosafety : promote the coordination between industries and risk assessor*. Journal of Physics : Conference Series, Vol. 429, 2013, 10 p.

OSTIGUY C. EMOND C., DOSSA I., MALKI Y., BOILY C., ROUGHLEY D., PLAVSKI A., ENCO C. A. *Mapping the use of engineered NM in Quebec's industries and research laboratories*. in Nanosafe 2012 : 3rd International Conference on Safe production and use of nanomaterials (3rd : 13-15 November, 2012 : Grenoble, France), Journal of Physics : Conference Series, Vol. 423, 2013, 8 p.



MECHANICAL AND PHYSICAL RISK PREVENTION



STUDIES THAT FALL UNDER THE MECHANICAL AND PHYSICAL RISK PREVENTION RESEARCH FIELD HAVE THREE MAIN ORIENTATIONS:

- 1. Assessment of the mechanical and physical risks generated by machines or the work environment**
- 2. Reduction of mechanical and physical risks**
- 3. Taking the human factor into account in the evaluation and control of mechanical and physical risks**



THIS FIELD LAUNCHED EIGHT NEW PROJECTS IN 2013:

Development of vibration and acoustic diagnostic methods for portable pneumatic nailers, Frédéric Laville, Pierre Marcotte, Jérôme Boutin, Marc-André Gaudreau.

Acoustic performance evaluation of back-up alarms in open work environments to achieve optimal use of such alarms, Hugues Nélisse, Chantal Laroche, Christian Giguère.

Knowledge transfer activity: Development of content for the dissemination of preventive knowledge applicable to work on lobster boats, Sylvie Montreuil, Francis Coulombe, Jean-Guy Richard, François Ouellet, Linda Savoie.

Studies of interaction between fill and containment structures for safer barricade design, Li Li.

Improving the safety and ergonomics of trap-hauler and support-table workstations – preparatory phase: analysis of the current situation and implementation of experimental conditions, Francis Coulombe, Sylvie Montreuil, Jean-Guy Richard.

Integrated inverse-problem method of in-situ stress measurement, Robert Corthésy, Maria Helena Leite.

Knowledge transfer activity: Fact sheet development – Choosing a lift truck seat belt assembly: guidelines for making informed choices. Sylvie Beaugrand, Denis Rancourt, Christian Larue, Marie-France d'Amours, Linda Savoie.

#2013

Knowledge transfer activity: Safety of plastic injection molding machines with peripheral equipment,
Yuvin Chinniah, Barthélémy Aucourt, Réal Bourbonnière, Sabrina Jocelyn, Marie-France d'Amours, Linda Savoie.

GAUVIN C., LARA J. *Gants résistant aux piqûres d'aiguilles – Évaluation de la dextérité manuelle, de la sensibilité tactile et du confort pour les travailleurs – Étude exploratoire,* Études et recherches / Rapport R-783, Montréal, IRSST, 2013, 72 p.

GIRAUD L., JOCELYN S., AUCOURT B., MASSÉ S., DAIGLE R. *Validation of a Mechanical Hazard Fault Tree for Interventions in Printing Press Danger Zones,* Studies and Research Projects / Report R-778, Montréal, IRSST, 2013, 97 p.

LAN A., OUELLET F., LESSARD L. *Les systèmes d'ancrage de garde-corps sur des toits plats,* Études et recherches / Fiche technique RF-768, Montréal, IRSST, 2013, 14 p.

RANCOURT D., BEAUGRAND S., LARUE C., MASSON G. *Ceinture de sécurité pour chariots élévateurs à contrepoids – Étude préliminaire de critères normatifs et d'utilisabilité,* Études et recherches / Rapport R-765, Montréal, IRSST, 2013, 88 p.

SIAS 2012 – *Actes de la 7e Conférence internationale sur la sécurité des systèmes industriels automatisés,* <http://www.irsst.qc.ca/media/documents/PubIRSST/SIAS-2012.pdf>

DOLEZ P., VINCHES L., PERRON G., VU-KHANH T., PLAMONDON P., L'ESPÉRANCE G., WILKINSON K., CLOUTIER Y., DION C., TRUCHON G. *Development of a Method of Measuring Nanoparticle Penetration through Protective Glove Materials under Conditions Simulating Workplace Use,* Studies and Research Projects / Report R-785, Montréal, IRSST, 2013, 124 p.

GAUVIN C., LARA J. *Worker Evaluation of Manual Dexterity, Tactile Sensitivity and Comfort When Wearing Needlestick-Resistant Gloves – Exploratory Study,* Studies and Research Projects / Report R-803, Montréal, IRSST, 2013, 68 p.

THE RESEARCH WORK DONE IN THIS FIELD GAVE RISE TO THE PUBLICATION OF ONE TECHNICAL FACT SHEET, THE PROCEEDINGS OF AN INTERNATIONAL CONFERENCE, AND FIVE RESEARCH REPORTS. THESE REPORTS INCLUDED THREE ENGLISH TRANSLATIONS.



MECHANICAL AND PHYSICAL RISK PREVENTION



THE RESEARCH WORK CARRIED OUT IN THIS FIELD GAVE RISE TO THE PUBLICATION OF 16 SCIENTIFIC PUBLICATIONS.

Peer-reviewed journal articles

ADEWUSI S., RAKHEJA S., MARCOTTE P., THOMAS M. *Distributed vibration power absorption of the human hand-arm system in different postures coupled with vibrating handle and power tools.* International Journal of Industrial Ergonomics, Vol. 43, No. 4, 2013, p. 363-374.

ARRIETA C., DONG Y., LAN A., VU-KHANH T. *Outdoor weathering of polyamide and polyester ropes used in fall arrest equipment.* Journal of Applied Polymer Science, Vol. 130, No. 5, 2013, p. 3058-3065.

CHINNIAH Y., BURLET-VIENNEY D. *Study on lockout procedures for the safety of workers intervening on equipment in the municipal sector in Québec.* International Journal of Occupational Safety and Ergonomics, Vol. 19, No. 4, 2013, p. 495-511.

DEWANGAN K. N., SHAHMIR A., RAKHEJA S., MARCOTTE P. *Seated body apparent mass response to vertical whole body vibration: gender and anthropometric effects.* International Journal of Industrial Ergonomics, Vol. 43, No. 4, 2013, p. 375-391.

Peer-reviewed journal issue

RAMAKRISHNAN R.(ed), MARCOTTE P.(ed), *Noise: Assessment & control.* International Journal of Industrial Ergonomics, Vol. 43, No. 6, 2013, 65 p.

Peer-reviewed conference papers

NGUYEN C. T., DOLEZ P. I., VU-KHANH T., GAUVIN C., LARA J. *Effect of protective glove use conditions on their resistance to needle puncture.* Plastics, Rubber and Composites: Macromolecular Engineering, Vol. 42, No. 5, 2013, p. 187-193.

VAILLANCOURT V., NÉLISSE H., LAROCHE C., GIGUÈRE C., BOUTIN J. *Comparison of sound propagation and perception of three types of backup alarms with regards to worker safety.* Noise & Health, Vol. 15, No. 67, 2013, p. 420-436.

VIALLET G., SGARD F., LAVILLE F. *Axisymmetric versus three-dimensional finite element models for predicting the attenuation of earplugs in rigid walled ear canals.* Journal of the Acoustical Society of America, Vol. 134, No. 6, 2013, p. 4470-4480.

BOYER S., SGARD F., LAVILLE F. *Sound transfer path analysis to model the vibroacoustic behaviour of a commercial earmuff.* in 21st International Congress on Acoustics: Proceedings of Meetings on Acoustics, (21st: June 2-7, 2013: Montréal, Canada), 2013, Vol. 19, No. 1, 9 p.

BRUMMOND M., SGARD F., PETIT Y., LAVILLE F., BOUTIN J. *Implementation of a simplified, artificial external ear test fixture for measurement of the earplug induced auditory occlusion.* in 21st International Congress on Acoustics : Proceedings of Meetings on Acoustics, (21st: June 2-7, 2013 : Montréal, Canada), 2013, Vol. 19, No. 1, 7 p.

LE COCQ C., NÉLISSE H., BOUTIN J., VOIX J., LAVILLE F. *Estimation of noise exposure level for subjects wearing hearing protector devices.* in 21st International Congress on Acoustics : Proceedings of Meetings on Acoustics, (21st: June 2-7, 2013 : Montréal, Canada), 2013, Vol. 19, No. 1, 8 p.

MEJDI A., SGARD F., ATALLA N. *Validity of transfer matrix method for prediction of the transmission loss of curved panels.* in 21st International Congress on Acoustics : Proceedings of Meetings on Acoustics, (21st: June 2-7, 2013 : Montréal, Canada), 2013, Vol. 19, No. 1, 8 p.

NÉLISSE H., LE COCQ C., BOUTIN J., VOIX J., LAVILLE F. *Comparison of subjective and objective methods for the measurements of hearing protector devices attenuation and occlusion effect.* in 21st International Congress on Acoustics : Proceedings of Meetings on Acoustics, (21st: June 2-7, 2013 : Montréal, Canada), 2013, Vol. 19, No. 1, 7 p.

ODDO R., GERARD A., PEARSON M., AMYOTTE A., MASSON P., SGARD F., BERRY A. *Industrial fan noise control using flow obstructions.* in 21st International Congress on Acoustics : Proceedings of Meetings on Acoustics, (21st: June 2-7, 2013 : Montréal, Canada), 2013, Vol. 19, No. 1, 9 p.

SGARD F., ATTALA N., GHOLAMI M., NÉLISSE H. *Tunneling effect on the sound transmission loss of a flat structure coupled with a porous material.* in 21st International Congress on Acoustics : Proceedings of Meetings on Acoustics, (21st: June 2-7, 2013 : Montréal, Canada), 2013, Vol. 19, No. 1, 9 p.

VIALLET G., SGARD F., LAVILLE F. *Influence of the external ear tissue domains on the sound attenuation of an earplug predicted by a finite element model.* in 21st International Congress on Acoustics : Proceedings of Meetings on Acoustics, (21st: June 2-7, 2013 : Montréal, Canada), 2013, Vol. 19, No. 1, 8 p.



SUSTAINABLE PREVENTION AND WORK ENVIRONMENT

STUDIES THAT FALL UNDER THE SUSTAINABLE PREVENTION AND WORK ENVIRONMENT RESEARCH FIELD HAVE THREE MAIN ORIENTATIONS:

1. Analysis of OHS problems and assessment of risks in relation to social, organizational, and demographic aspects and to technological changes
2. Development and application of measurement methods and evaluation tools (measurements of exposures and risk and protection factors, activity analyses, surveys, and data collection tools)
3. Interventions pertinent to, and management of, OHS problems (OHS management in small organizations, knowledge transfer and training, OHS management steps and tools, adjustment of work situations)

EIGHT NEW PROJECTS BEGAN IN 2013:

Implementation of an integrated prevention strategy for manual handling: study of factors that influence the transfer of learning following training for instructors, Denys Denis, Martin Lauzier.

Application of preventive practices by nurses: the innovative perspective of absorption capacity, Éléna Laroche, Saliha Ziam.

Evaluation of mobilization interventions for integrating musculoskeletal disorder prevention actions into specific health programs for establishments, Nicole Vézina, Henriette Bilodeau.

Identification of solutions to improve the health and safety conditions of floor-covering installers, Monique Lortie, Steve Vezeau, Sylvie Nadeau.

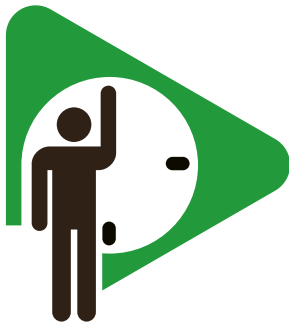
Knowledge transfer activity: Developing a worksheet on problems faced by teachers and students in vocational training centres in a changing learning and teaching environment, Charles Gagné, Céline Chatigny.

#2013

Validation of content relating to the work-study combination and OHS for an online self-training kit designed for student workers, Luc Laberge, Élise Ledoux.

Knowledge transfer activity: Mise à jour et bonification du site Web Manutention (updating and enhancement of the Manutention Web site), André Plamondon, Denys Denis, Louise Sutton, Linda Savoie.

Employment trajectory of student workers and OHS: treatment and validation of the data from the E16 collection of the Québec Longitudinal Study of Child Development (QLSCD 2013), Élise Ledoux.



SUSTAINABLE PREVENTION AND WORK ENVIRONMENT



THE RESULTS OF THE RESEARCH WORK DONE IN THIS FIELD LED TO THE PUBLICATION OF ONE TECHNICAL FACT SHEET, ONE GUIDE, AND SIX REPORTS. THESE REPORTS INCLUDED TWO ENGLISH TRANSLATIONS.

CORBEIL P., PLAMONDON A., TEASDALE N., HANDRIGAN G., TEN HAVE J., MANZEROLLE N. *Impacts biomécaniques et ergonomiques de la manutention chez les travailleurs obèses*, Études et recherches / Rapport R-781, Montréal, IRSST, 2013, 62 p.

DENIS D., LORTIE M., ST-VINCENT M., GONELLA M., PLAMONDON A., DELISLE A., TARDIF J. *Participatory Training in Manual Handling – Theoretical Foundations and Proposed Approach*, Studies and Research Projects / Report R-784, Montréal, IRSST, 2013, 142 p.

FILLION L., TRUCHON M., L'HEUREUX M., GÉLINAS C., BELLEMARE M., LANGLOIS L., DESBIENS J.-F., DALLAIRE C., DUPUIS R., ROCH G., ROBITAILLE M. A. *Amélioration des services et des soins de fin de vie – Mieux comprendre les effets sur la satisfaction et le bien-être des infirmières*, Études et recherches / Rapport R-794, Montréal, IRSST, 2013, 84 p.

GRAVEL S., LORTIE M., BILODEAU H., DUBÉ J. *Interaction Between Human Resources Management and OHS – Preparing Future Managers*, Studies and Research Projects / Report R-788, Montréal, IRSST, 2013, 72 p.

GRAVEL S., LEGENDRE G., RHÉAUME J., SÉGUIN G., GAGNÉ C. *Mesures de santé et de sécurité du travail dans les petites entreprises montréalaises embauchant une main-d'œuvre immigrante – Les stratégies favorables à la prise en charge*, Études et recherches / Rapport R-793, Montréal, IRSST, 2013, 173 p.

IMBEAU D., CHIASSON M.-È., JALLON R., FARBOS B., AUBRY K., DE MARCELLIS-WARIN N., ST-VINCENT M. *Interventions pour la prévention des TMS – Mesure de l'exposition aux facteurs de risque et aspects économiques*, Études et recherches / Rapport R-780, Montréal, IRSST, 2013, 68 p.

LORTIE M., ST-VINCENT M. *Outil d'aide à la planification pour une manutention manuelle sécuritaire*, Études et recherches / Fiche technique RF-782, Montréal, IRSST, 2013, 60 p.

SIMONEAU S., ST-VINCENT M., CHICOINE D. *Les TMS des membres supérieurs – Mieux les comprendre pour mieux les prévenir*, Études et recherches / Guide technique RG-779, Montréal, IRSST, 2013, 56 p.



THE RESEARCH WORK CARRIED OUT IN THIS FIELD GAVE RISE TO THE PUBLICATION OF 21 SCIENTIFIC PUBLICATIONS.

Peer-reviewed journal articles

ANTLE D. M., CÔTÉ J. N. *Relationships between lower limb and trunk discomfort and vascular, muscular and kinetic outcomes during stationary standing work.* Gait and Posture, Vol. 37, No. 4, 2013, p. 615-619.

ARJMAND N., EKRAMI O., SHIRAZI-ADL A., PLAMONDON A., PARNIANPOUR M. *Relative performances of artificial neural network and regression mapping tools in evaluation of spinal loads and muscle forces during static lifting.* Journal of Biomechanics, Vol. 46, No. 8, 2013, p. 1454-1462.

CÔTÉ J., NGOMO S., STOCK S., MESSING K., VÉZINA N., ANTLE D., DELISLE A., BELLEMARE M., LABERGE M., ST-VINCENT M. *Quebec research on work-related musculoskeletal disorders: deeper understanding for better prevention.* Relations industrielles/Industrial Relations, Vol. 68, No. 4, 2013, p. 643-660.

DENIS D., LORTIE M., PLAMONDON A., ST-VINCENT M. *Proposition d'une définition de la compétence en manutention et impacts sur la formation.* Le travail humain, Vol. 76, No. 2, 2013, p. 129-153.

EL OUAID Z., SHIRAZI-ADL A., PLAMONDON A., LARIVIÈRE C. *Trunk strength, muscle activity and spinal loads in maximum isometric flexion and extension exertions: a combined in vivo computational study.* Journal of Biomechanics, Vol. 46, No. 13, 2013, p. 2228-2235.

EL OUAID Z., SHIRAZI-ADL A., ARJMAND N., PLAMONDON A. *Coupled objective function to study the role of abdominal muscle forces in lifting using the kinematics-driven model.* Computer Methods in Biomechanics and Biomedical Engineering, Vol. 16, No. 1, 2013, p. 54-65.

GRAVEL S. *An overview of occupational disease research in Canada.* OOHNA Journal: Journal of the Ontario Occupational Health Nurses Association, Vol. 32, No. 2, 2013, p. 30-32.

GRAVEL S., RHÉAUME J., LEGENDRE G. *Occupational health and safety in small businesses in urban areas: the non-participation of immigrant workers.* Policy and Practice in Health and Safety, Vol. 11, No. 1, 2013, p. 19-29.



SUSTAINABLE PREVENTION AND WORK ENVIRONMENT



JOHANSEN T. I., SAMANI A., ANTLE D., CÔTÉ J. N., MADELEINE P. *Gender effects on the coordination of subdivisions of the trapezius muscle during a repetitive box-folding task.* European Journal of Applied Physiology, Vol. 113, No. 1, 2013, p. 175-182.

LEDOUX É., FOURNIER P.-S., CHAMPOUX D., PRUD'HOMME P., LABERGE M., AUROUSSEAU C. ET AL. *Portrait différencié des conditions de travail au Québec selon l'âge: un cadre d'analyse pour agir dans les milieux de travail.* Relations industrielles/Industrial Relations, Vol. 68, No. 4, 2013, p. 590-607.

LORTIE M., FAYE C., LAROCHE E., DESMARAIS L., DENIS D., NASTASIA I., GRAVEL S., GIRAUD L. *Bilan des études sur les guides de pratique en santé: qu'en retirer pour la santé et la sécurité au travail.* Pistes (Perspectives interdisciplinaires sur le travail et la santé), Vol. 15, No. 1, 2013, 20 p.

NEGRINI A., PANARI C., SIMBULA S., ALCOVER C. M. *The push and pull factors related to early retirees' mental health status: a comparative study between Italy and Spain.* Journal of Work and Organisational Psychology, Vol. 29, No. 2, 2013, p. 51-58.

THI GIANG H., CORBIÈRE M., NEGRINI A., MINH KHUE P., REINHARZ D. *Validation of the Karasek-job content questionnaire to measure job strain in Vietnam.* Psychological Reports, Vol. 113, No. 2, 2013, p. 363-379.

VIAU-GUAY A., BELLEMARE M., FEILLOU I., TRUDEL L., DESROSIERS J., ROBITAILLE M. J. *Person-centered care training in long-term care settings: usefulness and facility of transfer into practice.* Revue canadienne du vieillissement, Vol. 32, No. 1, 2013, p. 57-72.

Peer-reviewed conference paper

GRAVEL S., RHÉAUME J., LEGENDRE G. *Knowledge transfer in occupational health and safety for immigrant workers.* in Understanding Small Enterprises (USE) Conference Proceedings, (February 19-22, 2013: Nelson, New Zealand), 2013, p. 114-131.

Master's and doctoral theses

ANTLE D. *The use of participatory ergonomics and laboratory based methods to design and implement ergonomic solutions : addressing postural factors in an industrial setting*. Thèse de doctorat, Montréal, Université McGill, 2013.

DOUCET N. *Relations entre les conflits de rôles, la fatigue et la santé psychologique chez des étudiants occupant un emploi au cours de l'année scolaire*. Thèse de doctorat, Université du Québec à Chicoutimi, 2013.

LAROUCHE D. *Analyse du déplacement du bénéficiaire en assistance totale chez les techniciens ambulanciers-paramédics lors de situations réelles de travail*. Mémoire de maîtrise, Québec, Université Laval, 2013, 147 p.

MARTIN J.-S. *Relation entre le chronotype, l'exposition à la lumière et la SST chez les jeunes travailleurs aux études*. Mémoire de maîtrise, Québec, Université Laval, 2013.

Book

GRAVEL S., LORTIE M., BILODEAU H., DUBÉ J. *L'interaction entre les problèmes de gestion des ressources humaines et de santé et de sécurité au travail*. Québec, Presses de l'Université du Québec, 2013, 240 p. (collection Santé et société).

Book chapter

CHAMPOUX D., BARIL R., BEAUVAIS A., BRUN J.-P. *L'environnement des petites entreprises en SST : tour d'horizon des résultats de la recherche et des enjeux particuliers en contexte québécois*. in *L'intervention en santé et en sécurité du travail : pour agir en prévention dans les milieux de travail*, Montreuil, S. ; Fournier, P.-S. ; Baril-Gingras, G. (éds), Québec, Presses de l'Université Laval, 2013, p. 271-293 (Collection Santé et sécurité du travail).



OCCUPATIONAL REHABILITATION



STUDIES THAT FALL UNDER THE OCCUPATIONAL REHABILITATION FIELD HAVE FOUR MAIN ORIENTATIONS:

1. Development of tools for assessing the health of workers who have sustained work-related injuries and are at risk of disability
2. Study of the personal, clinical, organizational, and administrative determinants of a return to work
3. Development and implementation of rehabilitation and return-to-work interventions
4. Development and implementation of strategies designed for rehabilitation and return-to-work professionals



NINE NEW PROJECTS WERE LAUNCHED IN THIS FIELD IN 2013:

Understanding the process of rehabilitation and returning to work in the context of intercultural relations, Daniel Côté, Sylvie Gravel, Bob White, Danielle Gratton.

The return-to-work coordination practices of large Québec companies, Marie-José Durand, Iuliana Nastasia, Marie-France Coutu.

Defining the theoretical foundations of occupational rehabilitation programs involving the workplace and designed for workers with musculoskeletal disorders: a realist review, Marie-José Durand, Dominique Tremblay, Johannes R. Anema, Jean-Baptiste Fassier, Patrick Loisel, William S. Shaw, Alexandra Panaccio.

Workplace practices to ensure a safe and sustainable return to work of workers who have had a musculoskeletal disorder, Iuliana Nastasia, Marie-José Durand, Marie-France Coutu.

Study of the psychometric qualities of the Work Disability Diagnostic Interview (WoDDI) used with workers having a musculoskeletal disorder or a transient mental disorder, Marie-José Durand, Marc Corbière, Marie-France Coutu.

#2013



Updating of the systematic and descriptive review of the literature on the strategies for preventing the prolonged occupational disability of workers compensated for work-related musculoskeletal disorders, Iuliana Nastasia, Marie-France Coutu.

Central gain modulation and rehabilitation of workers with tinnitus, Sylvie Hébert, Philippe Fournier, Marc Schoenwiesner.

Exploratory study aimed at developing a Web site on the best practices related to disability and return to work (RTW), Christian Larivière, Daniel Côté, Iuliana Nastasia, Marie-José Durand, Marie-France Coutu, Marc Corbière, Clermont Dionne, Manon Truchon, André Bussièrès, Michael J.L. Sullivan.

Cross-sectional study comparing workers with torn rotator cuffs and healthy workers: correlation analysis of shoulder function and morpho-anthropometric and diagnostic-imaging variables, Nicola Hagemeister, Neila Mezghani, Nathalie Bureau, Patrice Tétreault.

THE RESEARCH WORK DONE IN THIS FIELD RESULTED IN THE PUBLICATION OF TWO GUIDES (INCLUDING ONE ENGLISH TRANSLATION) AND TWO RESEARCH REPORTS (ENGLISH TRANSLATIONS).

ROY S., DURAND M.-J., CORRIVEAU H.
Work Functioning Assessment of the Physically Impaired Person – Clinical Practice Guideline for Occupational Therapists, Studies and Research Projects / Technical Guide RG-797, Montréal, IRSST, 2013, 74 p.

ROY S., DURAND M.-J., CORRIVEAU H.
Development of a Clinical Practice Guideline on Work Functioning Assessment of the Physically Impaired Person, Studies and Research Projects / Report R-797, Montréal, IRSST, 2013, 83 p.

ST-ARNAUD L., PELLETIER M. *Guide pour soutenir le retour au travail et favoriser le maintien en emploi – Faciliter le retour au travail d'un employé à la suite d'une absence liée à un problème de santé psychologique, Études et recherches / Guide technique RG-758, Montréal, IRSST, 2013, 40 p.*

COUTU M.-F., DURAND M.-J., MARCHAND A., LABRECQUE M.-É., BERBICHE D., CADIEUX G.
Presence, Intensity, and Temporal Changes in Generalized Anxiety Disorder Maintenance Factors in Workers Undergoing Rehabilitation for Persistent Musculoskeletal Pain, Studies and Research Projects / Report R-767, Montréal, IRSST, 2013, 54 p.



OCCUPATIONAL REHABILITATION



THE RESEARCH WORK CARRIED OUT IN THIS FIELD GAVE RISE TO THE PUBLICATION OF 12 SCIENTIFIC PUBLICATIONS.

Peer-reviewed journal articles

CÔTÉ D., FROZZINI J., GRATTON D. *La compétence interculturelle dans le contexte des services de réadaptation physique et des agences de placement temporaire au Québec*. Revue Savoirs et Formation – Recherches et Pratiques, No. 3, 2013, p. 78-93.

CÔTÉ D. *Intercultural communication in health care: challenges and solutions in work rehabilitation practices and training: a comprehensive review*. Disability and Rehabilitation, Vol. 35, No. 2, 2013, p. 153-163.

COUTU M.-F., BARIL R., DURAND M.-J., CÔTÉ D., CADIEUX G. *Clinician-patient agreement about the work disability problem of patients having persistent pain: why it matters*. Journal of Occupational Rehabilitation, Vol. 23, No. 1, 2013, p. 82-92.

DIONNE C.E., BOURBONNAIS R., FRÉMONT P., ROSSIGNOL M., STOCK S.R., LAPERRIÈRE È. *Obstacles to and facilitators of return to work after work-disabling back pain: the worker's perspective*. Journal of Occupational Rehabilitation, Vol. 23, No. 2, 2013, p. 280-289.

GRANGEON M., GAGNON D., GAUTHIER C., LARIVIÈRE C. DUCLOS C., GOURDOU P. *Characterizing postural stability in a quasi-static sitting position among individuals with sensorimotor impairments following spinal cord injury*. Journal of Bioengineering and Biomedical Sciences, Vol. 3, No. 1, 2013, 10 p.

LARIVIÈRE C., MECHELI H., SHAHVARPOUR A., GAGNON D., SHIRAZI-ADL A. *Criterion validity and between-day reliability of an inertial-sensor-based trunk postural stability test during unstable sitting*. Journal of Electromyography and Kinesiology, Vol. 23, No. 4, 2013, p. 899-907.

LARIVIÈRE C., GAGNON D., DE OLIVEIRA E., HENRY S. M., MECHELI H., DUMAS J.-P. *Ultrasound measures of the lumbar multifidus: effect of task and transducer position on reliability*. PM&R: Journal of Injury, Function, and Rehabilitation, Vol. 5, No. 8, 2013, p. 678-687.

LARIVIÈRE C., BUTLER H., SULLIVAN M. J. L., FUNG J. *An exploratory study on the effect of pain interference and attentional interference on neuromuscular responses during rapid arm flexion movements*. The Clinical Journal of Pain, Vol. 29, No. 3, 2013, p. 265-275.

LARIVIÈRE C., GAGNON D., DE OLIVEIRA E., HENRY S. M., MECHELI H., DUMAS J.-P. *Reliability of ultrasound measures of the transversus abdominis : effect of task and transducer position*. PM&R: Journal of Injury, Function, and Rehabilitation, Vol. 5, No. 2, 2013, p. 104-113.

MANKOVSKY-ARNOLD T., WIDEMAN T., LARIVIÈRE C., SULLIVAN M. J. L. *TENS attenuates repetition-induced summation of activity-related pain following experimentally induced muscle soreness*. The Journal of Pain, Vol. 14, No. 11, 2013, p. 1416-1424.

Peer-reviewed book chapters

CORBIÈRE M., NEGRINI A., DEWA C. H. *Mental health problems and mental disorders – linked determinants to work participation and work functioning*. in Handbook of work disability prevention : prevention and management, Loisel, P., Anema, H. (éds), New York, Springer, 2013, p. 267-288.

COUTU M.-F., CÔTÉ D., BARIL R. *The work disabled patient*. in Handbook of work disability prevention : prevention and management, Loisel, P., Anema, H. (éds), London, Springer, 2013, p. 15-29.



SPECIAL PROJECTS



TWO SPECIAL PROJECTS BEGAN IN 2013.

Immigrant workers and OHS in Québec: state-of-the-art review of knowledge documented in published statistical studies and survey of available data sources, Pascale Prud'homme, Marc-Antoine Busque, Patrice Duguay, Daniel Côté.

Knowledge transfer activity – Leveraging the statistics produced at the IRSST – a tool for our partners, Patrice Duguay, Pascale Prud'homme, Charles Gagné, Linda Savoie.



OTHER SPECIAL PROJECTS WERE CARRIED OUT IN 2013. THEIR RESULTS WERE PUBLISHED IN EIGHT RESEARCH REPORTS, INCLUDING FOUR ENGLISH TRANSLATIONS.

LEBEAU M., DUGUAY P., BOUCHER A. *Les coûts des lésions professionnelles au Québec, 2005-2007*, Études et recherches / Rapport R-769, Montréal, IRSST, 2013, 66 p.

LEBEAU M., DUGUAY P., BOUCHER A. *Estimating the Costs of Occupational Injuries – A Feasibility Study in the Mining Industry*, Studies and Research Projects / Report R-774, Montréal, IRSST, 2013, 90 p.

ADAM-POUPART A., LABRÈCHE F., SMARGIASSI A., DUGUAY P., BUSQUE M.-A., GAGNÉ C., ZAYED J. *Impacts of Climate Change on Occupational Health and Safety*, Studies and Research Projects / Report R-775, Montréal, IRSST, 2013, 45 p.

MARCHAND A., BOYER R., NADEAU C., MARTIN M. *Predictors of Posttraumatic Stress Disorders in Police Officers – Prospective Study*, Studies and Research Projects / Report R-786, Montréal, IRSST, 2013, 81 p.

#2013



THE SPECIAL PROJECTS LED TO THE PUBLICATION OF ONE PEER-REVIEWED JOURNAL ARTICLE.

LEBEAU M., DUGUAY P. *The Costs of Occupational Injuries – A Review of the Literature*, Studies and Research Projects / Report R-787, Montréal, IRSST, 2013, 85 p.

LABRÈCHE F., DUGUAY P., BOUCHER A., ARCAND R. *Estimation du nombre de cancers d'origine professionnelle au Québec*, Études et recherches / Rapport R-789, Montréal, IRSST, 2013, 60 p.

MESSIER S., BELLAVANCE F., DUGUAY P. *Les accidents routiers au travail – Une revue de la littérature*, Études et recherches / Rapport R-791, Montréal, IRSST, 2013, 96 p.

PIGNATELLI S., BELLAVANCE F., DUGUAY P. *Accidents routiers au travail survenus au Québec de 2000 à 2008 – Caractéristiques et classification*, Études et recherches / Rapport R-792, Montréal, IRSST, 2013, 89 p.

ADAM-POUPART A., LABRÈCHE F., SMARGIASSI A., DUGUAY P., BUSQUE M., GAGNÉ C. RINTAMAKI H., HJELLSTROM T., ZAYED J. *Climate change and occupational health and safety in a temperate climate: potential impacts and research priorities in Quebec, Canada*. *Industrial Health*, Vol. 51, No. 1, 2013, p. 68-78.

Mission

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 network.

To fulfill this mission, the IRSST:

- carries out and funds research in its priority research fields;
- supports the development of research and new knowledge in occupational health and safety, in collaboration with the scientific community;
- disseminates and promotes knowledge generated through research, in both the workplace and scientific communities;
- plays a leadership role in anticipating emerging needs, raising awareness, and creating synergy in the area of occupational health and safety research;
- contributes to researcher training in occupational health and safety;
- provides laboratory services to the CSST and its network;
- contributes to the development of standards and regulations governing occupational health and safety;
- responds to ad hoc requests for specific expertise originating from various occupational health and safety stakeholders.

Vision

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;
- be used by its social partners in a spirit of joint collaboration;
- win recognition at national and international levels;
- derive maximum benefit from a well-established network of research and development collaborators.

Production

IRSST, Communications
and Knowledge Transfer Division
Louis Lazure, director

Editor

Jacques Millette

Collaboration

François Hébert
Marjolaine Thibeault
Maura Tomi

Coordination

Linda Savoie

Graphic Design

bertuch.ca

Photos

Pierre Cloutier, Dominique Desjardins,
Philippe Lemay, Jacques Millette

Translation

Leslie Macdonald

505 De Maisonneuve Blvd. West
Montréal, Québec, Canada H3A 3C2
Phone: 514 288-1551
Fax: 514 288-7636

ISSN 0820-8409

ISBN 978-2-89631-721-9 (Print format)

ISBN 978-2-89631-722-6 (PDF)

Institut de recherche Robert-Sauvé en santé
et en sécurité du travail (IRSST)

About 249,000 results (0.32 second)

IRSST

www.irsst.qc.ca/en/home.html ▼

The IRSST, established in Québec since 1980, is a scientific research organization well-known for the quality of its work and the expertise of its personnel ...

IRSST

[Find a publication](#) – [Laboratory Services](#) – [Directory](#) – [Scholarships](#)

Calculation of the Rm

[Exposure to mixtures of chemical substances in the workplace](#) ...