

the overall construction management processes overseen by a primary contractor. A new study is underway that integrates ergonomic training, planning, and oversight within the primary contractor's safety programs, and encourages planning to reduce ergonomic hazards during the preconstruction phase.

1597e PARTICIPATORY PROJECTS TO IMPROVE THE USE OF ERGONOMIC MEASURES

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Introduction Ergonomic measures are available to reduce high physical work demands among construction workers. Providing construction workers with information of risk factors alone will not be effective in increasing the use of ergonomic measures due to the complex working environment, the involvement of many different stakeholders and the conservative nature of the construction industry. Our aim was to study the process of face-to-face (F2F) and e-guidance (EG) strategies of participatory ergonomics (PE) company projects on the implementation of ergonomic measures to prevent musculoskeletal disorders.

Methods The implementation process was evaluated alongside a cluster randomised parallel intervention trial with a follow-up at six months regarding the effect of two PE guidance strategies on the use of ergonomic measures. The design of the study was described in Visser, *et al.* (2014). Ergonomic consultants guided six companies through face-to-face contact in F2F and six through email contact in EG. Whether the intervention was delivered as planned was evaluated by the process evaluation components dose delivered and dose received as described by Linnan and Steckler (2002). In addition, satisfaction and behavioural change among construction workers were evaluated.

Result Implementation activities delivered (F2F: 63%; EG: 44%) and received (F2F: 42%; EG 16%) in companies were low. The satisfaction with the PE strategies was strongly affected by the actual activities in the companies. For behavioural change, knowledge regarding risk factors and ergonomic measures (+14%; F2F) and culture regarding the norms, values and expectations of the company regarding working with ergonomic measures (+26%; EG) among workers increased.

Discussion This study showed that compliance to a face-to-face and an e-guidance strategy is low. To improve the compliance, it is advised to start with a face-to-face meeting with all stakeholders to see which parts of the intervention are needed and which guidance strategy can be used for these parts.

1594 VISION ZERO IN CONSTRUCTION

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Aim of special session To introduce *Vision Zero*, as developed by the International Social Security Association (ISSA) for the construction industry, and to describe its application and impact in developed and developing economies.

Presenters ¹Prof. Karl-Heinz Noetel, ²Mr. Paul Duphil, ³Dr. K.N. Sen, ⁴Mr. Jean Claude Poirier, ⁵Dr. Knut Ringen

1594a VISION ZERO IN CONSTRUCTION: SUSTAINABLE WORK AND SUSTAINABLE DEVELOPMENT

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Today factors like international competition, the demographic change, the proceeding structural change and the growing density of information determine everyone's lives. At the same time, due to these factors the economy, the society as well as organisations dealing with OSH like the International Social Security Association are facing major challenges worldwide in the field of the prevention of occupational diseases and injuries

Considering health as being the highest good of man, the primary focus should be on maintaining human health by all possible means. A reliable method for maintaining human health is to invest in the prevention of health hazards. At the same time investing in prevention helps to avoid much higher costs caused by occupational accidents, occupational diseases, and lost working time, and can also be regarded as a key competitive factor. Thus, prevention contributes to sustainable economic success of the companies as well as the preservation of employability of people.

The fatality rate in the field of construction is still higher than that in other industries. With its prevention strategy 'Vision Zero' ISSA Construction – by using appropriate preventive measures – seeks to create a working environment where no individual is injured or killed at work nor suffers from serious injuries or occupational diseases To achieve this, ISSA Construction sets seven Golden Rules and describes measures which contribute to meeting the named objectives. ISSA Construction already works together with ISSA Mining to achieve these objectives. The future ambitions to work together with all other ISSA sections on 'Vision Zero', thus paving the way to work together worldwide and across all sectors on a work environment with zero risk to get injured at work.

The Seven Golden Rules for 'Vision Zero' are the following:

Rule 1: Take leadership commitment by setting safety always as the number one priority on every agenda, by serving as a model for OSH matters, by reacting instantly to unsafe conditions and behaviour.

Rule 2: Identify hazards and risks by a systematic risk assessment, including maintenance and repairs, evaluating work accidents, diseases and near misses.

Rule 3: Set targets for safety by defining your own OSH targets, evaluating progress and adapt them if necessary, designing prevention campaigns.

Rule 4: Ensure a safe system by increasing the responsibility of all managers, implementing a safety management system.

Rule 5: Use safe and healthy technology by taking account of OSH when ordering new machinery or plant, using all machines in a safe way and checking safety installations regularly, providing safe access and egress.

Rule 6: Improve qualification by educating – because competence needs education –, by defining the required qualification for each workplace, and by setting up a plan for training and instruction.

Rule 7: Invest in people by involving your employees, using your employee's ideas about how to safety, acknowledging good safety performance, developing confidence and a culture of prevention.

1594b PREVENTION PAYS! EVIDENCE FROM FRANCEPaul Duphil. *OPPBTP, Boulogne Billancourt, France*

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Objectives The cost of prevention is often taken as an excuse for not acting or not fully implementing all required measures for effective OSH. Prevention is often presented as a matter of regulation and obligations, and the economic return of prevention actions is rarely studied. Based on field studies and experience, OPPBTP demonstrates with more than 200 practical cases that prevention pays, with an average ROI of 2.33. Online tools are being developed to facilitate the practice with construction management.

Methods OPPBTP developed a business case study, with accounting techniques. The methodology enables to identify all the operational impacts of the studied cases, short and long term, whether beneficial for productivity, quality, business activity, and to quantify them in term of financial impact. High interest from major French construction companies led OPPBTP to develop both training tools to transfer the know-how to a large population of OSH experts, and develop an online tool for case calculation. CPWR developed similar cases and tools. CPWR developed as well ROI calculation tools, based on standard US accounting standards.

Results More than 200 specific prevention cases, ranging from new equipment to training schemes or process improvement projects have been studied, showing an average return on investment equal to 2.33! Moreover, the work and its methodology enable OSH experts to include prevention action within the business logic that is first and foremost in private companies, and develop new arguments to convince managers and workers alike that prevention and production go hand in hand.

Conclusion Prevention pays! This popular motto among OSH experts needs to be demonstrated in a simple and convincing manner for frontline managers, and adequate tools be made available to them. This approach is complementary to existing academic studies that tend to demonstrate the same results, however addressing a different public. This study enabled not only to bring proof about the positive economic return of prevention, but it enabled to change the way companies look at prevention, and the way preventors look at economics. This is a very interesting finding of our studies.

1594c VISION ZERO FROM AN EMERGING ECONOMY PERSPECTIVEKrishna Nirmalya. *Larsen and Toubro Limited, Chennai, India*

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Changes in business narratives have been at pace, during the last few decades. Improved corporate governance, shift of focus from traditional economic performance to GRI mandated economic, environmental and social performances, commonly referred as 'triple bottom line' have brought perspective changes in the corporate world, globally.

While sharp awareness and concerted efforts on environmental front keep on gathering steam, it has become significant to substantiate and support the need to protect the people from the sources of immediate and acute harm. This is, in a way, influencing the alignment and advancement of 'VISION ZERO' with far reaching

positive consequences across the industrial and service sectors, obviously in varying degrees.

Study of 'Sustainability reports' of the organisational journey have shown significant differences within various sectors and across the enterprises, mostly driven by strong leadership commitments towards HSE. These organisations have tracked the journey in tandem with business objectives and goals, while some of the entities displayed the need of granting more time and support to catch-up.

Construction industry, which contributes around 7% to 10% of GDP, is among the most risky businesses as per several studies across the globe. Emerging economies with increasingly higher share of GDP, have registered enhanced contribution of incident and injuries.

Several challenges, including demographics and infrastructure related aspects, spanning from organisational factors to people related issues, impact the journey. At micro levels, local management, equipment and crew, fitness and suitability of all for the specific worksites, hugely matters.

Journey forward for higher level of achievement shall naturally be dependent on multiple factor, primarily though on sustained leadership from government, industry and labour organisations.

1594d DIAGNEO: A PRACTICAL TOOL FOR SMES TO IMPLEMENT VISION ZEROJean-Claude Poirier. *CRAMIF, Paris, France*

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The company owner or manager must be the driver of the implementation of a culture on prevention in order to develop sustainable work and a sense of well-being at work among their employees. But, most employers in the construction industry are small or medium size employers (SMEs). They have limited resources, including safety and health expertise. They also typically are the highest risk employers. How can we assist them in improving their safety and health performance?

Vision Zero is very practical approach to improving safety, by focusing only on the seven Golden Rules. In France, we have developed an online platform that employers can use to self-assess their safety performance. It is known as DIAGNEO, and is compatible with *Vision Zero*.

DIAGNEO was developed with minimal resources and has been validated by safety and health experts in collaboration with employers in the construction industry and is currently available to over 2 00 000 construction employers in the Paris region, free of charge. It is easy to use, and does not take a lot of time to complete.

After answers to several questionnaires, a profile of probable safety and health performance appears immediately in the form of graphics, which allows the employer to easily understand its deficiencies and where its priorities on regulatory, organisational and technical actions need to be placed.

The examination of specific risks to the workplace and exposures is a prerequisite for the prevention of occupational risks. DIAGNEO makes it feasible to do so for even very small and resource-poor employers. There is no longer any excuse for employers not to undertake a self-assessment on Safety and Health at Work.