

PREVENTION THROUGH DESIGN (PtD)-A PRIMER

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Global challenges confront us: energy shortages, pollution, warming, transportation, natural/man-made disasters, disease, famine, clean water, public education, environmental and occupational health and safety issues.

The **MISSION** of PtD National Initiative is to prevent or reduce occupational injuries, illnesses and fatalities through the inclusion of prevention considerations in all designs that impact workers. This can be achieved by:

- Controlling hazards (risks) at the source or as early as possible in the life cycle of items or workplaces.
- Including design, redesign, and retrofit of new or existing work premises, structures, tools, facilities, equipment, machinery, products, substances, work processes and the organization of work.
- Enhancing the work environment through the inclusion of prevention methods in all designs that affect workers and others on the premises.
- Continuing to strive for high-quality research and prevention activities that will lead to reductions in occupational injuries and illnesses among workers in the PtD cross-sector.
- Committing to the development of practical solutions to the complex problems caused by occupational diseases, injuries and fatalities (e.g. NIOSH Health Hazard Evaluations (HHE) Program).
- Fostering partnerships with stakeholders like labor, government, and industry* to achieve successful outcomes. (*e.g. Agriculture, Forestry, Fishing, Healthcare and Social Assistance, Mining, Construction, Manufacturing, Wholesale, retail Trade, Transportation, Warehousing, Utilities)
- Formulating strategies that promote the transfer and translation of research findings into prevention practices and products that will be adopted in the workplace.

The GOAL of PtD is to reduce the risk of occupational injury and illness by integrating decisions affecting health and safety in all stages of the design process. An observation from Dr. John Howard noted: “One important area of emphasis will be to examine ways to create demand for graduates of business, architecture and engineering schools to have basic knowledge in occupational health and safety principles and concepts.

NIOSH PtD: “Addressing occupational safety and health needs in the design process to prevent or minimize the work-related hazards and risks associated with the construction, manufacture, use, maintenance and disposal of facilities, materials, and equipment” (i.e. Eliminating hazards at the design stage).

Note: Recent studies reveal that successful implementation of PtD concepts can significantly improve worker health, safety, reduce occupational fatalities and minimize future hazard (risk) exposure.

Although PtD focuses on design, other important factors to include are: behavior, management, leadership, ergonomics, personal protective equipment, occupancy, operations, maintenance and demolition. It combines many traditional disciplines into a *transdisciplinary* approach.

Transdisciplinary research emphasizes teamwork uniting diverse professional and scientific backgrounds that come together to share and adapt concepts, methodologies, processes and tools to create innovative and stimulating ideas that explore and expand integrated solutions across all affected traditional areas of study.

PtD incorporates four major stages to hazard abatement and risk management:

1. *-Pre-operational* stage occurs during the initial planning design, specification, prototyping, and construction processes where the opportunities are the greatest and costs lowest for risk avoidance, elimination, reduction and control.
2. *-Operational* stage means hazards and risks are identified, evaluated and mitigated through redesign initiatives or changes in work methods *before* (exposure) incidents occur.
3. *-Post-incident* stage is where root cause investigations of incidents and exposures determine necessary interventions.
4. *-Post-operational* stage means when demolition, decommissioning, reuse, recycle, reclaim and disposal are performed.

Examples-

- Purchase quiet equipment
- Use green building materials and methods
- Prefabricated walls and subsystems.
- Integrate robotics for high hazard tasks
- Fixed ladders (stairs) to elevated surfaces
- Anchorage points for fall protection
- Guarded skylights (unbreakable glass)
- Parapets (sloped drainage)

Challenges and Opportunities-

- No regulatory requirement
- No recognized professional duty
- No immediate financial incentives
- Liability concerns for owners, architects, designers and engineers.
- Lack of knowledge (experience)

References-

1. PREVENTION THROUGH DESIGN; Plan for the National Initiative; DHHS (NIOSH) Publication No. 2011-121, November 2010.
2. *The State of the National Initiative on Prevention through Design; Progress Report 2014*; DHHS (NIOSH) Publication No. 2014-123; May 2014. (www.cdc.gov/niosh)
3. Presentation: Owner's Role in Facilitating Prevention through Design- *Prevention through Design- a new way of doing business*, August 23, 2011; Presenters: Toole, T. Michael; Gambatese, John.
4. Ertas, Atila; "Prevention through Design: A Transdisciplinary Process"; Case Studies. The Academy of Transdisciplinary Learning & Advanced Studies, National Occupational Research Agenda (NORA) funded study.
5. Felperin, Daniel Jay; "The Construction Safety Guide: *Injury and Illness Prevention through Design*", ISBN 978-1-931002-09-7; Wordrunner Press, 2013.