TOP CONSTRUCTION PROBLEMS AND THE NATIONAL OCCUPATIONAL RESEARCH AGENDA (NORA) AGENDA TO ADDRESS THEM

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ABSTRACT

The National Institute for Occupational Safety and Health (NIOSH) used a decade-long National Occupational Research Agenda (NORA) process to involve stakeholders in identifying and implementing targeted research. The first NORA effort resulted in 21 cross-cutting topics. NIOSH is taking a "sector approach" for the second decade of NORA (2006-2016) and Construction is one of eight sectors developing a sector-specific national research agenda. This presentation will describe the multi-stakeholder NORA "Construction Sector Council" used to identify ten top problems, the process used to discuss candidate topics, and the resulting list of topics. It will also describe the use of a Construction Program Logic Model to guide NIOSH efforts in making an impact on end outcomes via research. Lastly, the presentation will describe the current status of efforts to develop strategic goals for each of the top problem topics including the current version of the draft goals. Each strategic goal includes an overall goal related to improved outcomes, performance measures to track progress toward outcomes, along with several intermediate research and research to practice goals. Taken together, the various strategic goals will comprise the National Construction Agenda.

Keywords: Construction, Research, Strategic Planning, Goals, Impact, Stakeholders

1. INTRODUCTION

NIOSH initiated a decade-long National Occupational Research Agenda (NORA) process in 1996 to involve stakeholders in identifying and then implementing targeted research priorities. Approximately 500 organizations and individuals provided input into the development of NORA, resulting in 21 cross-cutting topics. A variety of partners worked together over the decade to stimulate innovative research and improved workplace practices to address these priorities.

NORA entered its second decade in 2006 with a new "sector-based" orientation intended to better move research into practice within workplaces. Each of eight industry sectors[2] is creating its own national sector agenda. NIOSH acts as the steward of NORA and

[2]The 8 sectors are: Agriculture; Forestry & Fishing; Construction; Healthcare & Social Assistance; Manufacturing; Mining; Services; Transportation, Warehousing & Utilities; and Wholesale and Retail Trade

facilitates the work of multi-stakeholder "NORA Sector Councils" in developing and implementing the resulting agendas over the decade (2006-2016). The "NORA Construction Sector Council" is the group that has been working to develop the draft agenda for the construction sector.

Several other features differentiate the second decade of NORA from the original NORA effort. In comparison to the 21 "priority research areas" developed during the first NORA, the second decade priorities are structured as strategic goals targeting top sector issues and outcomes. Each strategic goal is in turn supported by a number of intermediate goals reflecting the specific changes and improvements that workers, contractors, and owners need to make in order to progress toward the strategic goals. The framework emphasizes "Research to Practice" (R2P) to promote the transfer and translation of research findings, technologies, and information into effective prevention practices and products and to further promote their adoption in the workplace (see http://www.cdc.gov/niosh/r2p/). Underlying research and R2P goals are selected based on the knowledge and activities needed to support the identified intermediate goals. The use of strategic outcome-oriented goals reflects evolving government performance planning concepts derived from the U.S Office of Management and Budget (OMB) "Program Assessment Rating Tool" (PART) initiative.
(http://www.whitehouse.gov/omb/part/)

The resulting National Construction Agenda serves as a mechanism for construction industry stakeholders to provide input on the most relevant safety and health problems in construction. Once established, it is intended to inspire decision makers to include these topics among their top priorities, and to steer researchers to relevant and cohesive topic areas for research proposals. Lastly, it is intended to encourage dialog and partnering among stakeholders on a manageable subset of key issues ---thus increasing the collective ability of the larger construction community to make an impact in reducing injuries and illnesses among construction workers.

2. METHODS

A variety of information sources were used to develop the draft goals including Town Hall meetings, solicitation of written comments, and breakout sessions at the 2006 NORA Symposium. The initial NORA Construction Sector Council kickoff meeting was held in March of 2006 and additional members were added for the September 2006 meeting. The 35 member council includes contractor and trade association, labor, researcher, owner, federal agency, state agency, safety professional, industrial hygiene professional, and non-profit and insurance organization representatives. A listing of NORA Construction Sector Council members is available at http://www.cdc.gov/niosh/nora/councils/const/planpart.html.

Council members were briefed on the NORA comments received along with available surveillance findings on construction injuries and illnesses. Group members were asked to contribute their opinions on the three top problems in construction for discussion.

NIOSH input to the NORA council was represented by a draft of NIOSH Construction Program Strategic Goals. The program had begun to develop these draft goals in 2005 in response to the OMB PART requirements.

The sector council used a variety of criteria to discuss and look at top problem candidates. These were developed as questions such as:

- What evidence supports this as a top problem?
- Why does the problem persist?
- What would be the ideal situation?
- What stage are we at in our knowledge and understanding of this construction problem?
- Can the problem be described using common priority-setting criteria such as severity, incidence or prevalence?
- How much change is needed for near-term improvement?
- What stage is the problem at from a construction practice perspective?

Discussions and multi-voting led to the selection of a list of "top ten" construction topics. This number was arbitrarily selected to allow a variety of topics without overextending the ability to provide meaningful support. The Agenda is not intended to be an inventory of all issues and it should not be viewed as suggesting that other topics are unimportant.

NORA workgroups, co-chaired by NORA Construction Sector Council members, were established to convert each top problem topic into strategic and intermediate goals. NIOSH provided a "logic model" to provide a visual picture and shared understanding of the path by which the research process contributes to impacts on reducing injury and illness. The Institute had developed a logic model to facilitate strategic planning to optimize relevance and impact. It was also incorporated into the framework developed for evaluation of NIOSH Research Programs by the National Academies. (http://www.cdc.gov/niosh/nas/framework1.html).

The logic model allows stakeholders to appreciate that researchers tend to have few direct links to construction end users such as workers, contractors, and developers. Instead, research impact is most often achieved when intermediaries such as trade associations, labor unions, and professional associations use the research information for their own products and actions which then influence end users. The logic model provided common terminology, reinforced the need for researcher and intermediary construction stakeholder partnerships, and provided a way to structure goals, since strategic goals need to reflect improved end outcomes, and intermediate goals then need to reflect the most important actions that intermediate groups can take to help contractors and workers to improve performance.

Workgroups included other interested individuals participating as "corresponding" members to the NORA Construction Council. Workgroups developed sufficient intermediate goals to address key gaps and needs. They were not limited to any specific budget or anticipated activity level. The resulting workgroup products, while varying somewhat on length and detail, all include the same basic goal and performance measure

elements. The draft goals were posted for comment on December 21, 2007. Council members believe that the ten areas represent important construction topics where research and combined industry efforts are needed over the next decade.

Resulting Draft Strategic and Intermediate Goals

Each numbered strategic goal includes a performance measure, narrative, and 3 to 8 numbered intermediate goals (each including a performance measure and from 2 to 7 research or R2P goals). For sake of brevity, only strategic and intermediate goals are provided herein. The complete draft National Construction Agenda can be accessed at: http://www.cdc.gov/niosh/nora/comment/public/ConstDraftDec2007/

3. STRATEGIC GOAL #1

Reduce Construction Worker fatalities and serious injuries caused by falls to a lower level

Performance Measure: Address technical solution gaps, increase implementation of effective fall prevention measures, and utilize design approaches and social marketing campaigns to support a 33% reduction in the rate of fatal falls among construction workers over the decade.

IG 1.1 - Partner with construction stakeholders and safety professionals to identify the top three fall-related problems requiring technical engineering solutions and develop and evaluate options to fill these gaps.

IG 1.2 - Partner with Construction stakeholders to expand awareness and use of existing effective fall prevention and protection solutions by construction employers and workers

IG 1.3 - Partner with architects, engineers, and construction organizations to expand the use of "safe-by-design" practices for fall prevention via demonstration projects and guidance.

IG 1.4 - Work with construction partners to develop and implement a national campaign to reduce fatal and serious injuries associated with construction falls to a lower level.

4. STRATEGIC GOAL #2

Reduce fatal and nonfatal injuries from contact with electricity among construction workers.

Performance Measure: Address technical solution gaps, and increase dissemination and use of interventions to reduce construction-related electrical injuries to support a 20% reduction in the rate of electrocutions among construction workers over the decade

IG 2.1 - Investigate ways to improve the performance of power line proximity warning alarms to protect operators of mobile vehicles and nearby construction workers.

IG 2.2 - Investigate ways to protect construction workers from electrocution hazards involving power line contact through hand-carried metallic objects and vehicle-related contacts.

IG 2.3 - Investigate ways to protect construction workers from contact with live electrical wiring and components by studying electrical installation, maintenance, and repair tasks and recommending ways to improve work practices, techniques, and tools

IG 2.4 - Investigate ways to protect construction workers from contact with live electrical wiring and components by studying electrical installation, maintenance, and repair tasks and recommending ways to improve work practices, techniques, and tools.

5. STRATEGIC GOAL #3

Reduce fatal and serious injuries associated with struck-by incidents associated with objects, vehicles, and collapsing materials and structures.

Performance Measure: Address risk factor gaps, develop new interventions, and increase dissemination and use of interventions to reduce construction-related struck-by injuries associated with objects, vehicles, and collapsing materials and structures by 33% over the decade.

IG 3.1 – Objects: Improve understanding of risk factors associated with struck-by fatalities and serious injuries associated with falling, flying, swinging, and rolling objects; and compare findings to existing regulations and guidance.

IG 3.2 – Objects: Use risk factor and gap information to develop and evaluate interventions and guidance for preventing struck-by injuries involving falling, flying, swinging, and rolling objects. Partner with construction stakeholders to disseminate resulting interventions**.**

IG 3.3 – Vehicles: Evaluate strategies to reduce worker exposure to being run over by heavy construction vehicles and equipment.

IG 3.4 – Vehicles: Promote the availability and use of operator visibility limit information for road construction equipment.

IG 3.5 – Vehicles: Evaluate worker injury risks associated with the expanded use of night work in the road construction industry.

IG 3.6 – Vehicles: Gain widespread usage of effective prevention measures in the road construction industry

IG 3.7 – Collapsing Materials/Structures: Characterize circumstances associated with collapsing structures (e.g. scaffolding, demolition work, partially built structures)

IG 3.8 – Collapsing Materials/Structures: Partner with construction stakeholders to greatly increase the diffusion of existing effective practices for preventing fatalities and serious injuries associated with trench collapses.

6. STRATEGIC GOAL #4

Reduce hearing loss among construction workers by increased use of noise reduction solutions, practices, and hearing conservation programs by the construction community

Performance Measure – A performance measure cannot be set for this strategic goal until better baseline information can be obtained and analyzed. Intermediate goal 1 will address this need and is expected to support a performance measure such as "Increase use of noise reduction solutions, practices, and hearing conservation programs by the construction community by 33% over baseline in ten years."

IG 4.1 - Use existing information supplemented by survey research to develop a baseline on current noise control and hearing loss practices in construction.

IG 4.2 – Increase awareness about noise hazards and solutions among construction workers, contractors, owners, and suppliers.

IG 4.3 – Increase the availability and adoption of quieter tools and equipment in the construction industry via research and implementation of a "Buy Quiet" campaign.

IG 4.4 – Develop and promote the use of model programs and practices by construction owners, governmental groups, professional groups, and best practice employers.

7. STRATEGIC GOAL #5

Reduce silica exposures and future silicosis risks among construction workers by increasing the availability and use of silica dust controls and practices for tasks associated with important exposures.

Performance Measure – A performance measure cannot be set for this strategic goal until better baseline information can be obtained and analyzed. Intermediate goal 1 will address this need and is expected to support a performance measure such as "Increase use of silica control solutions and exposure reduction practices by the construction community by 33% over baseline in ten years."

IG 5.1 - Use existing information supplemented by survey research to develop a baseline on current silica control practices and programs in construction.

IG 5.2 – Increase awareness about silica hazards and known solutions among construction workers, contractors, owners, and suppliers

IG 5.3 – Increase the availability of engineering and work practice options for reducing silica exposures

IG 5.4 – Develop model practices and programs and promote their use by construction owners, governmental groups, professional groups, and best practice employers.

IG 5.5 – Evaluate hazard and exposure assessment research gaps associated with silica in construction

8. STRATEGIC GOAL #6

Reduce welding fume exposures and future related health risks among construction workers by increasing the availability and use of welding fume controls and practices for welding tasks

Performance Measure – A performance measure cannot be set for this strategic goal until better baseline information can be obtained and analyzed. Intermediate goal 1 will address this need and is expected to support a performance measure such as "Increase use of welding fume exposure reduction solutions and practices by the construction community by 33% over baseline in ten years".

IG 6.1 - Use existing information supplemented by survey research to develop a baseline on current welding control practices and programs in construction.

IG 6.2 – Increase awareness about welding fume hazards and known solutions among construction workers, contractors, owners, and suppliers

IG 6.3 – Increase the availability of engineering and work practice options for reducing welding exposures.

IG 6.4 – Develop model practices and programs and promote their use by construction owners, governmental groups, professional groups, and best practice employers.

IG 6.5 – Evaluate hazard and exposure assessment research gaps associated with welding fumes in construction

9. STRATEGIC GOAL #7

Reduce the incidence and severity of work-related musculoskeletal disorders among construction workers in the U.S.

Performance measure: Increase the number of effective interventions (e.g., technologies and 'best practices') to reduce construction workers' exposures to WMSD risk factors and

develop effective methods to improve and expand intervention adoption and diffusion in the construction industry

IG 7.1 - Develop and evaluate practical field exposure assessment methods for use by contractors to prioritize the effectiveness of workplace interventions.

IG 7.2: Conduct studies, including short-term prospective studies, to characterize the effects of work activities on the musculoskeletal systems among workers in different trades and construction divisions and help identify high-risk activities/trades.

IG 7.3 – Expand the availability of effective interventions to prevent WMSDs in Construction.

IG 7.4 – Improve the acceptance, diffusion, and adoption of MSD interventions and solutions by contractors, owners, and workers**.**

10. STRATEGIC GOAL #8

Increase understanding of factors that comprise both positive and negative construction safety and health cultures; and, expand the availability and use of effective interventions to maintain safe work practices 100% of the time in the construction industry.

Performance Measure: This goal will be successfully achieved if by 2016, NIOSH, along with its stakeholders and the construction industry as a whole, increases its recognition and understanding of the complexity of safety and health culture and strives to use successful measurement and intervention tools to create a positive culture at the worksite.

IG 8.1- Develop an understanding of factors that contribute to a positive or negative safety and health culture in the construction industry and a working definition and framework**.**

IG 8.2 - Develop a set of validated measurement methods of safety culture in the construction industry.

IG 8.3 - Develop effective intervention measures that result in an improved safety and health culture in the construction industry.

11. STRATEGIC GOAL #9

Improve the effectiveness of safety and health management programs in construction and increase their use in the industry.

Performance Measure – Form partnerships with successful companies, unions, and associations to learn which management practices promote job safety and health. Then

build products (training and promotion materials in a variety of media), hold conferences, and reach 25% of the construction industry with these messages by 2012**.**

IG 9.1 – Develop a baseline to describe and understand the current use of safety and health management programs in construction.

IG 9.2 - Improve understanding of the effectiveness of best practice construction safety and health management programs and program elements

IG 9.3 – Partner with best practice contractors, on best practice sites or projects, to develop and expand safety and health management program elements that address important emerging issues

IG 9.4 – Partner with best practice small employers to identify the most important safety and health management elements and increase the use of programs tailored to small construction employers.

IG 9.5 – Partner with trade associations, management associations, and other construction stakeholders to disseminate new information and practices and to expand the use of effective safety and health management programs.

12. STRATEGIC GOAL #10

Improve understanding of how construction industry organization factors relate to injury and illness outcomes; and increase the sharing and use of industry-wide practices, policies, and partnerships that improve safety and health performance.

Performance Measure – Increase the recognition of the external and internal characteristics of the organization of the industry that may impact (e.g., reduce or contribute to) injury and illness outcomes, and increase the availability and use of best practices in the construction industry to improve health and safety performance.

IG 10.1 - Characterize the connections between construction industry organization and safety and health performance and identify changes that might improve performance.

IG 10.2 – Evaluate and improve current construction system mechanisms used to define and influence safety and health roles.

IG 10.3 - Study how subcontractors and small construction employers affect construction system safety and health performance. Develop and disseminate model practices for improving subcontractor and small employer safety performance on multi-employer construction projects.

IG 10.4 - Study and improve the effect of various workers' compensation arrangements and mechanisms on construction injury and illness at the system level.

IG 10.5 - Study and enhance the role of regulatory, consultative, consensus and other organizations and policies for improving construction safety and health at the industry level.

IG 10.6 Evaluate the nature of construction work and the inherent work organization factors that can influence the risk of injuries and illnesses. Develop recommendations and solutions to address impacts.

IG 10.7 - Integrate the findings from the previous intermediate goals to provide an overarching safety and health framework, logic model, and management system for the construction industry.

13. STRATEGIC GOAL #11

Increase the recognition and awareness of construction hazards and the means for controlling them through broad dissemination of quality training for construction workers, including non-English speaking workers.

Performance Measure: Demonstrate a minimum set of safety and health competencies required for all workers on construction sites to recognize hazards and the methods to control or avoid them through access to quality training and educational materials.

IG 11.1 – Perform a construction training needs analysis**.**

IG 11.2 – Survey current training programs, models, materials and best practices to identify the scope of training resources available.

IG 11.2 – Survey current training programs, models, materials and best practices to identify the scope of training resources available.

IG 11.3 – Develop new or improved training programs, models, materials, and methods.

IG 11.4 – Promote the dissemination and use of construction training best practices, materials, and methods.

14. STRATEGIC GOAL #12

Increase understanding of how vulnerable worker groups experience disproportionate risks in construction work and expand the availability and use of effective interventions to reduce injuries and illnesses among these groups.

Performance Measure: This goal will be successfully achieved if by 2016, there is improvement in the understanding of what constitutes worker vulnerability; expansion of the existing knowledge base of injury, illness, and exposure of vulnerable worker populations; and increased distribution of effective interventions.

IG 12.1: Improve surveillance of work-related injuries, illnesses, hazards and related costs among vulnerable workers in construction in order to set intervention priorities, guide future research, and evaluate progress in reaching prevention goals.

IG 12.2 - Improve our understanding of conditions and risk factors that contribute to the vulnerability of workers and the mechanisms though which vulnerability places workers at increased risk for work-related injury (or illness) in the construction trades, and their longitudinal effects.

IG 12.3 - Develop and disseminate materials on effective interventions so as to increase the utilization of these methods by construction stakeholders and influence policy-makers. Based on existing information, Hispanic workers should be an important target group, but efforts should not neglect other vulnerable groups including other immigrant groups and inexperienced workers.

15. STRATEGIC GOAL #13

Increase the use of "prevention through design (PtD)" approaches to prevent or reduce safety and health hazards in construction.

Performance Measure: Increase the use of "Construction Hazards Prevention through Design" (CHPtD) by 33% over the next 10 years.

IG 13.1 – Characterize the current use of CHPtD and coordinate efforts to promote its use.

IG 13.2 – Confirm the most prevalent obstacles to acceptance and implementation of CHPtD: fear of liability; lack of expertise in safety and in designing for safety; and increased costs associated with CHPtD.

IG 13.3 - Develop tangible products and methods to address identified CHPtD obstacles and challenges.

IG 13.4 - Expand the use and evaluation of CHPtD practices.

IG 13.5 - Develop incentives for architects and engineers to include the following in facility design plans and specifications: methods for: safer project erection, safe operation, safe service and maintenance, and for safety of the public

16. STRATEGIC GOAL #14

Improve surveillance at the Federal, State, and private level to support the identification of hazards and associated illnesses and injuries; the evaluation of intervention and organizational program effectiveness; and the identification of emerging health and safety priorities in construction.

Performance Measure – Increase available surveillance resources, construction information products, strategies for improving surveillance, and use of surveillance resources by construction stakeholders to meet the intermediate goal performance

IG 14.1 – Partner with surveillance researchers and federal and state surveillance programs to support, enhance, and expand collection of traditional surveillance information relevant for the construction sector

IG 14.2 – Partner with professional associations, surveillance experts, insurance companies, regulatory and consultation organizations to explore, develop, and implement new types of construction-sector hazard, exposure, and performance indicators to supplement current surveillance approaches.

IG14.3 – Partner with best practice employers, labor organizations, and project owners to explore, develop and implement model safety and health surveillance measures to support improved safety and health performance at the enterprise and project level

17. A PLAN FOR THE DECADE AHEAD (2006-2016)

Because NORA is intended to provide an agenda for the nation, we strongly encourage construction stakeholders to participate and partner on specific strategic and intermediate goals. To provide comments either use the online form at: http://www.cdc.gov/niosh/NORA/comment/public/ConstDraftDec2007/comments.html ; or send an email with the subject line "**ConstDraftDec2007: Comments"** to noracoordinator@cdc.gov . Comments will be accepted through April 30, 2008.

Membership in the NORA Construction Sector Council will rotate over time. Please share any interest in participating on the Council or as a corresponding member by emailing the author. The NORA goals, along with recommended topics arising out of the National Academies review of the NIOSH Construction Program, will be incorporated into future research funding mechanisms to drive the direction of construction research towards these strategic goals. All of the goals include performance measures. These will be tracked over the decade starting from initial baselines (some baselines need to be created as early intermediate goals).

In conclusion, the National Construction Agenda provides a mechanism for construction sector stakeholders and researchers to work together on shared priorities to make a difference for employee safety and health. Please join us.

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