CPWR THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

Worksite Assessment Team Site Visit Report for City Center and Cosmopolitan Construction Projects Las Vegas, Nevada

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Worksite Assessment Team - Site Visit Report

A team consisting of Janie Gittleman and Don Ellenberger of CPWR (The Center for Construction Research and Training), accompanied by Matt Gillen and Max Kiefer of NIOSH (The National Institute for Occupational Safety and Health), conducted a site-visit to the City Center Construction project site on August 14-16, 2008. A number of work-related fatalities at this large construction project heightened concern about worker safety. In response, this evaluation was undertaken as a result of an agreement reached between Perini Building Co. (General Contractor) and the Southern Nevada Building Trades Council (representing all site workers). The primary purpose of the visit was to better understand safety management and programs used by the Perini Building Company at both the City Center and Cosmopolitan construction projects and to provide constructive feedback to improve safety and health on these projects. During the site visit, an average of 7,200 employees (day shift) in multiple crafts worked at the site.

The visit included participation in the Perini site safety orientation session, discussions with Perini Safety and Health Management personnel, review of various Perini safety program materials, field observations accompanying Perini safety personnel as they interacted with personnel on the site, and discussions with workers on the site. A secondary goal of the visit was to provide preliminary feedback to Perini Safety Staff on results from the open-ended questions of the pilot workplace safety climate survey (which began at the end of July 2008) and to provide recommendations. The NIOSH team members provided technical assistance in response to a request from CPWR.

This site visit and report is one component of an overall worksite safety assessment being performed by CPWR on the City Center and Cosmopolitan sites. Because most of the fatalities resulted from falls, a fall hazard identification and control audit was conducted by West Virginia University (WVU), one of CPWR's research partners. The report from this audit was provided to Perini Building Company and the Building Trades Council in September 2008, and a preliminary safety climate survey report was provided in October 2008. A final safety climate report, based on a sample of 3,000 workers, in addition to Perini Senior Management, Superintendents, and Foremen completing surveys, will be provided to Perini and the Building Trades in December 2008.

I. Site Safety Orientation

On Monday morning, August 14th, 2008, two team members who had not previously visited the site attended the Perini Site Safety Orientation Session. Eighty-four new employees from multiple trades were in the orientation training, which Perini indicated was typical. Orientation provides important information to employees about safety on a construction site, including rules, responsibilities, and mechanisms for ensuring safety issues are promptly investigated. It also provides messages to employees about the safety culture on a site (e.g., management commitment, overall adherence to good safety practice, safety vs. production, etc.) The following observations and recommendations are provided regarding the site safety orientation.

Direct messages delivered

The orientation was valuable and provided numerous safety messages to new workers including but not limited to these examples:

- Perini enforces a zero tolerance policy on safety for workers and supervisors
- Workers are primarily responsible for their own safety
- Injuries can be prevented – rules and regulations represent accumulated lessons learned on safety and it is important to follow them
- Drugs and drinking have no place on this job
- Workforce diversity and mutual respect is important to Perini
- Subcontractors are responsible for providing additional information about site and job hazards
- Subcontractors with more than 40 employees on this site are expected to have a full-time safety representative
- Employees should report unsafe conditions to supervisors
- Follow the chain of command for safety…and it is OK to go around your supervisor if they are not responsive
- Perini disciplines supervisors who unfairly take action against employees reporting safety issues
- Perini insists on using the most protective standard – whether it is based on OSHA, local requirements, or company policy

- This is a 100% tie off job for any work six feet or higher, or within six feet of an edge

- PPE is important and required – and here is how you need to take care of it (NOTE: It is important to note however that hearing protection was not covered)

- Production speed should not affect safety – for example if it takes 5 minutes to check a harness, it takes 5 minutes, end of story

- Heat stress is a major issue on this job – and here's what workers need to do to prevent it

Indirect messages that might be perceived by attendees

Various aspects of the orientation delivery and content could potentially be perceived as sending indirect messages that undermine or conflict with the intended orientation safety messages. Several examples are provided below, followed by the rationale for why this message could be perceived as sending an unintended message. A suggested solution is provided for each example. In a few cases, sample talking points are provided as ideas for Perini to consider.

1. Perceived message: Perini does not place a high value on communication with Non-English speaking employees.

   -Rationale: The Spanish language translator stopped translating 15 minutes into the orientation, and the rest of the three hour orientation was English only.

   -Suggested solution: Arrange for translation throughout or use smaller group sessions for employees who communicate primarily in Spanish or other languages.

2. Perceived message: Some Perini safety rules are inconsistent and this may cause workers to get in trouble.

   -Rationale: Employees are not provided a copy of the statement of rules they have to sign and hand in. The signed statement differs from the Zero Tolerance Policy handout employees are given. For example, the signed statement includes the statement: "Employees shall report all injuries, accidents, and near misses immediately to their supervisors **and to Perini Safety Personnel" (emphasis added)**. The "Minimum Safety Expectations" included on the Zero Tolerance Policy handout only mentions a more general requirement to report any injury or incident.

-Suggested solution: Examine and modify policies for consistency and insure that employees are given a copy of any rules requiring their signature.

3. Perceived message: Perini may not really want to hear from workers on safety - since they don't provide contact information.

   -Rationale: The orientation includes messages to report to or contact Perini yet the orientation does not provide employees with any safety phone number, open office hours, or describe how often employees can expect to see safety personnel doing walkaround safety visits. The Zero Tolerance Policy handout does not include any contact information for Perini Safety.

   -Suggested solution: Provide contact information for Perini Safety - See next section for sample talking points.

4. Perceived message: Perini may not really value honest communication about safety.

   Rationale: The orientation includes no explicit mention of the six fatalities that have occurred on this site, despite the fact that they have received wide press coverage and many at the session are likely to have heard about them. This might suggest to some attendees that Perini would prefer not to hear about or address certain tough safety problems.

   Suggested solution: Discuss fatalities (including circumstances, root causes, investigations and press coverage) in an objective, transparent, and open fashion, the previous fatalities as part of the orientation. See next section for suggested sample language to further consider.

5. Perceived message: Being enthusiastic about safety may set you apart from supervisors and unions.

   -Rationale: The orientation instructor reported that he is called names (e.g. "Safety Hitler") because he is strict on safety.

   -Suggested solution: Remove mention of this point from orientation.

6. Perceived message: Employees who report a hazard or near miss may wind up being disciplined or fired if they weren't following all of the rules. This will likely result in a disincentive to report incidents.

   - Rationale: The orientation and handout materials provide a heavy emphasis on safety rules and the zero tolerance policy. While Perini program requirements call for the orientation to include an explanation that the reporting of hazards will

not cause any detrimental action to be taken against an employee (Section 1E, paragraph 2.3), this message is overshadowed during the orientation and is not included in the handout.

Suggested solution: Insure that the zero tolerance policy messages are balanced by explaining the importance of reporting hazards and near misses and that no detrimental action will be taken; include this information on handout materials. See sample text in following section.

Messages that Perini should consider including in the orientation to improve safety awareness and help build a solid safety culture from the start

The orientation provides an important opportunity to communicate key issues and to discuss the safety culture on the site. Not discussing the previous site fatalities contradicts messages about commitment, openness, and the importance of communicating about safety and health problems. The topic should be fully discussed during the orientation. Studies of workplace safety culture suggest that senior management commitment to safety; realistic and flexible customs and practices for handling both well defined and ill defined hazards; continuous organizational learning through feedback systems, monitoring, and analysis; and shared care and concern for hazards across the workforce are factors that reflect and promote a "good" safety culture [Pidgeon and O'Leary, 2000]. Another important factor that can influence safety culture is two-way communication - involving top-down, bottom-up, and horizontal communication channels [HSE, 2005].

The following are examples of positive messages that Perini should consider including in the orientation (sample talking points are provided as a starting point for discussion). Note that several messages described below might necessitate some changes in the current safety management program.

1. Desired message: Top Management at Perini is committed to safety.

   Sample talking points: *"Top Management at Perini is committed to safety. It's how we do business at this site ---from the craft worker to the top brass. It's not optional. Its part of everyone's job and we want you to think about it that way."*

2. Desired message: Perini has a safety management system in place to ensure safety and it is appropriate for you to contact us on safety if needed.

   Sample talking points: *"We have a system in place to manage safety and we want you to understand it and your role in ensuring a safe workplace. We have a Perini safety person for each of the 19 subprojects. That person is there to check on the job, make sure that subcontractors are following through on their*

commitments, and serve as a resource for questions. You should go through your subcontractor first in most cases, but you can also contact Perini safety with questions. Here is how to contact us:

By phone -
By stopping by –
By email -
By talking to us during our safety site observations –

If you ever feel that you are being pressured to work unsafely (e.g., take shortcuts, emphasize speed over safety) or are discouraged from reporting safety issues, please contact us immediately.

3. Desired message: Orientation includes a Perini safety handbook that includes additional information on safety procedures and provides a helpful reference. (NOTE: Section 1E, paragraph 2.3 of the Perini Health and Safety Policies and Procedures indicate that Perini and subcontractor employees are to be issued a safety handbook. It was not provided or mentioned in the orientation we attended.)

   Sample talking points: *"Each worker gets a Perini safety handbook as part of their employee orientation. Here is your copy (or here is how you will be getting your copy). It includes a lot more information on safety procedures and provides a helpful reference.*

4. Desired message: It is very important that new employees understand the unique aspects of the City Center /Cosmopolitan Project sites that can affect safety. (NOTE: Perini should consider giving these types of site-related hazards a special name to raise their profile and encourage communication among trades to manage them).

   Sample talking points: *"There are unique aspects to this job that can affect safety. Here are four main points:*

   - *First, this is a big job – It's a $9 Billion project and may just be the biggest job you will ever get to work on in your career.*

   - *Second, this is a complex job – we are building a small city right on the strip and many of the buildings have unusual designs. New workers and subcontractors are continuously entering the worksite. The site is dense with more tall buildings being constructed than you typically find on a Las Vegas project. The result is more congestion: equipment trying to share the same space, and more construction traffic and blind spots when you*

are walking on the site. You are also very likely to have to work in closer proximity to other trades than you have previously experienced. You are going to consider others to be in your way (and they will feel you are in their way) and you will need to find a way to make things work. These situations can pose safety or health hazards developing and you will need to be aware of this. On this site, we call these "situation hazards"[1]*.*

- *Here is why we make a distinction between regular hazards and situation hazards:*

  Regular hazards *are safety or health concerns that are the same from job to job and are covered by OSHA standards (e.g., not wearing PPE or not being tied off). We expect everyone to address these hazards and we enforce our zero tolerance policy for these hazards. We have put the most important rules on the back of your ID and we expect you to know them* (NOTE: suggestion for using back of ID to communicate key rules).

  Situation hazards *are safety or health concerns that develop because of the complexity of the site, such as a schedule delay leading to one subcontractor working below another contractor who is not yet finished, coordinating multiple trades on a fast-track job, or changes that interfere with completing work the way it was planned. We have to be aware that these situations can lead to safety problems and we need to work together to prevent them by good planning, good communication and problem-solving. Perini safety is here to help you and your subcontractor figure out how to deal with situation hazards that come up. We have put a general number where you can reach us anytime 24/7 on the back of your ID.* (NOTE: suggestion for using back of ID to communicate key information).

  (NOTE: Using a concept such as regular vs. situation hazards provides a way to differentiate between zero tolerance issues and need-to-communicate issues)

- *Third, this job operates on all three shifts, working overtime is common, and temperatures routinely exceed 100 F in summer months. You need to be aware of and guard against fatigue in yourself and co-workers. There are no safety rules in effect for overtime. Therefore, it is your and your supervisor's responsibility to consider all factors and ensure overtime work*

[1] The site visit team suggests the term "situation" hazard to describe this category, based on the Mitropoulos et al [2005] paper titled: "Systems Model of Construction Accident Causation". That paper discusses how task unpredictability – meaning that the work cannot be completed as planned – can lead to hazardous "situations". The value of making this distinction is to provide a term that contractors and workers can use to recognize and communicate to resolve problems when this occurs.

does not result in fatigue, poor work habits, and safety problems. If you are working 70 hour weeks you are going to make more mistakes….and that extra money won't do your family any good if you suffer a serious injury or fatality. You need to use the buddy system and make sure that neither you nor your co-workers are showing signs of fatigue. Here is a card with the symptoms of heat stress and fatigue – know these symptoms. (NOTE: suggestion for pocket card)

- *Fourth, if we sound like we are trying to scare you some it's because there have been six unfortunate deaths already on this job and that is six too many. We want the best workers on this job. We want you to go home safely at the end of the shift. We want you to view safety as part of your everyday duties on the job. And we want you to share information about hazards. If you see something unsafe report it right away so we can fix it. We all need to watch each other's back on this job.* (NOTE: Additional information would also be provided on circumstances, root causes, etc.)

5. Desired message: Communication is an important part of safety.

   Sample talking points: *"Communication is an important part of safety. If you have a safety question, a close call, something doesn't seem right, a language barrier that is causing problems, or if a situation hazard appears to be developing because two trades are in each other's way you need to speak up to your supervisor. Perini safety personnel can also step in to help answer questions.* ***It is Perini policy that the reporting of hazards will not cause detrimental action to be taken!***

   Lastly, Perini will communicate important site-wide safety information to you – here is how we will do that. (NOTE: Perini should describe to attendees how Perini will communicate important site safety messages).

II. Safety Program Management

Walkaround observations related to safety program management

Team members accompanied Perini safety personnel during routine safety walks on two different shifts as they performed routine safety walks. This helped familiarize team members with the worksite and the magnitude of ongoing projects/activities. Safety personnel were knowledgeable about the work area safety issues and appeared to have a good rapport with construction workers. It appeared that the safety program philosophy emphasized enforcement and discipline for workers who did not follow rules and policies (as opposed to holding supervisors and contractor management responsible).

While valuable, the daily safety walks the team participated in more closely resembled site tours and did not allow team members the opportunity to observe interactions between Perini safety personnel and subcontractor foremen or safety personnel. For example, we were unable to observe the following:

-What happens when a hazard is observed? Does the Perini safety representative ask workers to fix it on the spot or does he or she communicate the hazard to the subcontractor foreman or safety person and observe how they intervene to direct the hazard to be remediated? What if any additional discussions occur, is there is a competent person involved?

-What discussion occurs if a situation hazard is observed? Are workers and/or foreman asked why they are doing it that way to understand potential underlying causes?

-How clear are lines of responsibility between the Perini safety personnel and the subcontractor personnel?

Records review

A request was made for numerous safety-related records during an initial CPWR scoping visit on June 24-25, 2008. An additional request for records was made during the August 14-15, 2008 visit, and Perini Safety provided a sample of various documents to the team to assist in evaluation of safety program management. The resulting records review, while limited in nature, provided several insights into understanding of program operation.

- Personal Daily Safety Logs

Two of these logs, which are maintained by Perini Safety representatives, were examined. Each included daily safety observations, activities, and issues along with notification of injuries, safety violations, corrective write-ups, or disciplinary actions taken. Each log utilized before-and-after photos to document hazards remediated that day.

One log included information on a July 7, 2008 incident where a crane accidentally hooked a netting pole mounted on level 55 (Aria Bldg.), resulting in the pole falling down to level 2. This is a type of incident that could lead to a fatality or serious injury and should receive an in-depth investigation to identify root causes and appropriate safeguards to ensure it does not occur again. There was no indication from the materials provided to the team that an investigation would be initiated for this incident, although it is possible that an investigation was done, but was not mentioned in that particular daily log.

Closer evaluation of Perini safety policies (Section 1L.1.5) indicates that these also call for a number of other types of daily and periodic site safety inspections including:

-Daily informal inspections by the Project Manager, Project Superintendent, and Safety Engineer (to result in written reports when appropriate)

-Weekly Project Manager / Project Superintendent inspections
-Weekly Onsite Safety Engineer/collateral duty engineer inspections

-Monthly insurance carrier loss control consultant inspections
-Monthly independent safety consultant (for Nevada locations) inspections

-Periodic Perini Division Safety Director inspections
-Periodic visits by the OSHA consultation program as available

Records associated with these types of inspections were not examined during the August site visit.

- Safety Committee minutes

The 19 site sub-projects are organized into three "Blocks" and each block uses a monthly safety committee meeting to facilitate communication of safety information between Perini and subcontractor safety personnel. Safety Committee minutes from nine meetings were examined. The minutes were from three different blocks and dates ranged from January 2008 to August 2008. The minutes suggest the main function of the meetings are to report on new hazards needing correction and reporting on progress in correcting previously identified hazards. Several of the minutes also indicated that monthly injury and illness statistics were discussed. One surprising finding was that none of the meeting records included any mention or discussion of "Incident investigation" reports.

Most of the minutes used a sign-in sheet indicating attendance by 15-20 individuals. The Block C group used a master sign-in sheet that allowed identification of those absent. This indicated that 23 of 49 (47%) did not attend. This should be considered unacceptable and management should require mandatory attendance. Several of the minutes reviewed (see quotes below) suggested that fundamental system safety issues continue to recur suggesting that insufficient action is being taken to ensure lessons are learned and problems fully resolved.

-Barriers to Reporting ("Some employees are afraid to report injuries to their foremen for fear of retaliation. This is unacceptable and any foremen or supervisor who practices this should be counseled. We as safety people need to reassure employees that there is nothing to fear and encourage them to report injuries.")

-Production pressures ("Safety hazard reporting should not be looked at as slowing down production".)

-Communication to workers ("There was concern that when incidents happen, that no word gets to workers onsite to stop rumors. This can cause a stressful work environment. Conclusions to all incidents should be given job wide in a general memo about what caused the incident and what will be done to keep it from happening again in the future".)

The minutes suggest that follow-up on many issues is good but some problems continue to recur. Upper level Perini safety managers should monitor the minutes and use the information to further target recurring problems. For example, patterns showing recurring topics could be targeted for development of new initiatives, procedure clarifications, and/or development of communication materials. The review also suggests that these meetings are underutilized as a forum for sharing and discussing findings from incident investigations.

The communication quotes above mentioned the need for developing some type of "general memo" to communicate incidents to site workers. This need was also mentioned in the "Desired Message" #5 in the orientation discussion. Such a memo could report in two phases: an initial phase to simply describe what happened and general recommendations and reminders, and a second phase after the investigation is complete with more details on what can be done to prevent recurrence. For example, employees told a CPWR team member about an incident at the Cosmopolitan site where a scissors lift was dragged over by a forklift that got tangled in the scissor lift electrical cord. However, site employees had heard that the incident was due to the aerial lift being too close to a leading edge. Not only were the basic facts of the story confused, but the real lessons of forklift safety and use of electrical cords on a scissor lift were completely missed.

Note that Perini safety procedures (Section 1B.13) also indicate that a site safety committee, consisting of equal number of management and employee representatives shall meet no less than once a quarter. Copies of notes or minutes from this site-wide group were not examined during the site visit. These might provide additional insights into site safety program management.

- City Center News

The July 24, 2008 edition of the City Center News was examined. It provides a weekly report on the status of all projects on the site. The document includes a report on the week's Incidents/Accidents on a weekly basis, however, it is only circulated to Perini staff and not to subcontractors.

Perini injury tracking (an example was provided for the week of 07/17/08 through 07/24/08) indicates that injuries at the site are occurring among new hires < 90 days on the job and among younger employees. Incident/accident tracking is conducted

by Perini safety staff and stored in a database. The tracking system contains information on date, body part affected/event, material involved, and time on the job. However, there appears to be little or no feedback provided to subcontractors on the injury/accident experience of their workers, and there is no longitudinal tracking of patterns to determine whether patterns of injuries are persistent among certain contractors on the site.

- Incident Investigation Report

A copy of Appendix E of the City Center Construction Safety Guidelines, titled "Incident Investigation Report" was provided to the CPWR team. This form is used for investigation of injuries, property damage, vehicle incidents, and other related incidents. While the form lists 11 "cause factors" for investigators to consider – each with two to five possible answer boxes, the list does omit some causal factors likely to be important on such a large project. For instance, the list should include the following potential factors:

-Inadequate supervision or supervisory violations
-Inadequate design
-Schedule/production pressure
-Training deficiencies
-Situation factors caused by multiple contractors sharing the same workspace

In addition, some of the category box choices are insufficient to cover the range of likely root causes associated with each category. Several examples are provided below:

-Personal conditions category does not include a box for "fatigue/extended overtime"
-Equipment category does not include a box for "inadequate maintenance" or "inadequate inspection"
-Procedures category does not include a box for "existing procedures (or job hazard analyses) do not address situation hazard" or "insufficient clarity"
-Communication category does not include a box for "language barrier"
-Planning category does not include a box for "lack of coordination" or "hazard not addressed by pre-task planning".

Incident investigations provide an important input for any safety program. The value of the investigations depends on the rigor and completeness of the investigation. It is important to ensure that system program deficiencies are addressed and to counter the natural tendency to focus on individual employee errors and to forget "Human errors" are in fact often provoked by "latent conditions" such as time pressure, understaffing, inadequate equipment, fatigue, inexperience, unworkable procedures, or unanticipated conditions [Reason, 2000].

We recommend that Perini revise its incident investigation form and procedures to improve the ability to identify root causes that can be addressed by improving the

safety and health management program. Other suggestions for improving incident investigation include:

-List system safety/latent condition factors before worker error factors to insure that they are considered.
-Involve parties other than the immediate foreman or general foreman in some types of investigations to reduce potential bias from "investigating yourself".
(Note: current Perini procedures call for foremen and general foremen to investigate accidents and for site safety managers/coordinators to "assist" in investigations)
-Provide refresher training on incident investigation with an emphasis on the importance of identifying system safety/latent factors using updated forms.
-Provide peer review of investigations by other supervisors.
-Provide for union involvement for certain types of incidents.
-Use outside parties to periodically audit incident investigations for completeness and quality.
-Develop mechanisms (such as using monthly safety meetings) to share findings from significant incident investigations.

Note that our review of incident investigation practices must be viewed as limited as the team was not provided with incident investigation reports associated with recent fatalities (given ongoing legal proceedings), nor examples of other recent non-fatal incident investigations.

Discussions with Perini Safety Staff

On August 15-16, 2008 CPWR staff met with the Perini global safety director and two safety managers to discuss aspects of the safety management program.

We obtained limited records/examples of safety management outputs including the City Center News incident reports, Pass down reports, and a safety committee meeting agenda, and examples of several personal daily safety log (pass down) reports.

There is no on-site clinic at the City Center site, consequently all workers requiring medical attention must be escorted from the site. Given the magnitude of workers on the site and the broad array of problems listed in Perini incident reports, this seems to be an inefficient safety management practice that could affect the ability to provide expedient care for injured/ill workers, and provide a disincentive for reporting.

A Perini safety engineer reported that Perini has overall responsibility for providing potable drinking water on site. However, subcontractors are responsible for water pick-up and delivery to workers on-site. Preliminary feedback on climate surveys indicates there have been frequent problems with the distribution and availability of drinking water to workers. Anecdotally, the site team was told there have been between five and 30 heat stress cases per week.

Safety considerations regarding how jobs are designed, engineered, and scheduled wasn't apparent. We were unable to determine Engineering, Project Manager, or Designer responsibility and role for designing jobs safely. We did receive interest on the part of Perini Safety Management in learning about scheduling software which accounts for Safety in the scheduling process. CPWR provided a demonstration of the software to Perini, which expressed possible interest in future field tests of the software.

While the CPWR assessment team did accompany several Perini safety staff around the site, we did not observe any Perini interactions with subcontractor safety personnel. Such interactions can provide valuable insights into system management. Alternatively we observed Perini safety staff requesting workers to fix safety problems they saw such as leaking oil from a scissor lift, and electrical cord trip hazards. This is not conducive to a successful safety program (management/supervision should be involved).

III. Worker Climate Survey Responses—Open Ended Narrative Question

Two team members met with Perini safety staff to discuss preliminary feedback from workers regarding the open - ended narrative question of the ongoing safety climate survey (Begun July 23 - ongoing). **This question asked for feedback about job safety and actions that would improve safety**. The responses provided below reflect the range of issues raised by workers on this survey question. Some are paraphrased and some multiple entries addressing the same topic were not included in the list below. The topics below are categorized into four areas:

Housekeeping

- Blockage of doors, hallways, egress in general *(also relevant for safety)*
- Bad sanitary conditions in Porta Johns – not emptied often enough
- Water not replenished frequently enough on site
- Not enough trash receptacles on site, trades not cleaning up after themselves, better hallway organization needed
- When crafts complete assignments they should be held responsible for removing scraps and excess materials
- Need to have more cleaning crews working each floor to remove debris
- Carpenters have stud scrap and drywall scrap everywhere. Repeated complaints to safety personnel have been unaddressed and it continues to be a problem

Communication and Safety Program Management

- *****Concern about job loss if trade-off made to favor safety over production
- Worker perception that co-workers are insufficiently trained for high-rise commercial work (when questioned about high rise construction experience in safety orientation 1 out of 60 workers raised his hand)

- *Worker requested to operate equipment at wind speeds higher than regulation allows in order to meet the production schedule
- Better scheduling is necessary so that each trade has the time to do their part without interference from other trades
- Safety people not visible
- *Remediation of problems identified by workers not done in timely fashion
- Safety people preaching safety, but as soon as they are gone General Foremen and Superintendents start yelling for production—concern is they care more about their bonuses than the people who work for them
- Too often people walking under material that is being lifted or lowered with no horn sounded
- Tool box talks are too general and are not site-specific
- *The only time safety is a priority is when OSHA is coming on the job
- Job site needs a joint labor- management safety committee ASAP
- *Safety people are trying to intimidate workers so instead we say nothing
- *Many workers on the job don't speak English so we have difficulty communicating about safety problems
- *Give safety personnel the authority to fix problems immediately without having to discuss the issues in committees and return with lip service
- *If safety concerns are reported, workers get punished for holding up progress, or laid off. "I used to be a good person and not look the other way, but now I must or I won't have a job."

Safety and Injury Hazards

- *Drywallers working under mechanical trades
- Holes in floor often not covered and properly marked
- Small debris, wood, nails, metal clippings falling from above in the towers
- Need more eye wash stations on the site on every floor
- Handrails not sufficient to support 200lbs
- Lack of traffic control is a major hazard on this site
- Large gravel is a tripping hazard, smaller grade material should be used so pedestrians can walk safety
- Lack of safety equipment PPE-Safety glasses, respirators
- *Iron workers do not have sufficient personnel on fire watches and don't look when throwing things off the building
- Buggies are driving too fast throughout the job site—poor traffic control—pedestrians should have right of way
- This site needs on-site clinic/paramedic because time is critical when someone is injured
- Need more safety people on the site
- *Perini seems satisfied with the illusion of safety –A Perini safety person stepped up a damaged ladder, stepped over a hole and sent a guy home for not wearing

safety glasses—the next day the ladder was still damaged and the hole was still not covered

Health Hazards

- Concern about exposures to monokote materials
- Insufficient ventilation
- Need swamp coolers to remove hot, humid air in bldgs that collect heat during the day and that remain oppressively hot and humid at night
- Perini needs to do a better job providing MSDS on the materials present on the site
- Complaints about exhaust, fumes, and dust are unaddressed
- Carpenters cutting concrete slabs without proper ventilation
- Not enough fresh air on basement floors
- Workers getting sick due to heat

***** Concerns marked with an asterisk reflect comments indicative of safety program management shortcomings (e.g. "Safety people preaching safety, but as soon as they are gone GFs and Supers starting yelling for production"), a subpar safety culture (e.g. blocked exits, poor housekeeping), and safety implementation approaches that are not conducive to success (e.g. intimidation, lack of authority).

These issues are based on worker feedback from the open ended question on the "Worker Safety Climate" surveys conducted from the end of July to the end of August 2008. The information captured represents all of the responses to the open ended question completed by slightly over 400 workers (n=411).

IV. Limited walk-through observations

On August 14th and 15th the site team performed a walkthrough survey accompanying Perini safety staff and observing their interactions with personnel on the site. Walkarounds were conducted during two day and one night shift. Approximately 170 sub-contractors were on the site.

The projects on this construction site present unusual designs and considerable safety challenges as a result of frequent design changes. The site has highly complex architecture, which often requires unusual measures to allow access and safely complete tasks. Although the purpose of the site visit was not to conduct a site safety audit, several safety concerns were identified by the CPWR team while onsite. At approximately 10:00am on the 14th of August, the team observed workers and a variety of vehicles in close interaction with ongoing projects, workers, and pedestrians. Traffic was not well controlled, and an ongoing excavation project in this area did not have access control or barricades: The swing radius of the backhoe on the mechanical

trencher extended outside the controlled work zone and into areas of vehicular and pedestrian traffic. We observed a near miss incident with a vehicle.

Non-compliance with PPE, primarily safety glasses, was frequently evident. Non-compliance with basic PPE requirements is indicative of a poor safety culture, an ineffective safety program, and lack of supervisor/foreman understanding of their responsibility for safety.

A third issue raised was communication across numerous trades and contractors (timely and effective communication). An estimated 30% of the workforce consists of non-English speakers. It was observed that there was no Spanish translation after the first 15 minutes of orientation. A request for foremen safety climate surveys in Spanish suggests that foremen on the job cannot read English sufficiently well to participate in taking a survey with a 6th grade literacy level in English.

While accompanying Perini safety personnel during a night shift from 1:00am to 5:00am the CPWR team observed a Crane operator leave his cab to assist an ironworker and glazier with hanging a corner piece of a curtain wall on the 54th floor of the Aria building. The operator got out the cab and stepped onto an unguarded platform without fall protection, hard hat, or any other PPE. This occurred at 2:15am. As he left the cab and stepped out onto an external ledge, he reached out to grab a tag line to assist the ironworker and glazier. Thus, he was at least 600 feet off the ground, without fall protection, and engaged in an activity that appeared to be outside the normal course of his duties. During the pick and placement of corner window piece on the 54th floor, the safety engineer on duty told the operator to return immediately to his cab which he did after briefly arguing with Perini safety staff. When an incident like this occurs, the policy should be to notify all crane operators of the incident and to warn against the practice. It is also useful to speak further with the worker involved to better understand the potential motivation for this action. Mitropoulos [2005] has described how actions commonly associated with experienced construction worker competency and efficiency – such as short cuts and tricks of the trade – can bring workers closer to the boundary of safety. It is possible that the crane operator perhaps thought he was being efficient by assisting the other workers with one of the most difficult and time consuming window placements (since the particular placement location was inside the brace holding the crane to the building). Understanding how tendencies for efficient construction can contribute to safety problems can lead to “teachable moments” for the individuals involved and valuable insights for safety program management.

V. Feedback on Safety Concerns and Climate from Randomly Selected Workers: On-Site Interviews

On August 15, 2008, bi-lingual staff from CPWR conducted informal interviews with construction workers throughout the City Center and Cosmopolitan projects. The purpose of these discussions was to obtain spontaneous feedback from workers and

their opinions of safety on the job site. CPWR was unaccompanied by Perini management during these discussions. All workers were asked if they knew about the negotiated agreement between Perini and the Southern Nevada Building Trades regarding worker safety (providing OSHA 10-hr training). All workers were aware of the OSHA 10-hr training, and were very cooperative; they all shared their opinions and ideas without reservation.

CPWR began interviews at 5:30 a.m. at the Theater building, and ended at about 11:30 a.m. at the Cosmopolitan. The use of leading or provocative questions was avoided and questions were very general and open-ended; for example, "What do you think about safety here on the job?" and "How would you compare your experience regarding safety here with other jobs you have worked on?" and "Are there any concerns you have about safety here on the job?" No specific responses were solicited, and there was no mention of what other workers had said in previous interviews.

Interviews with sheet metal workers. Their biggest concern was work scheduling. They stated that carpenters were erecting walls before they could complete their duct runs, thereby requiring them to tear out that work in order to complete their tasks. They also noted staging of materials was both a production problem as well as a safety problem because while materials from various crafts needed to be staged before installation, they had to either move those materials, or work around, on or above them to complete their tasks.

They reported flaring tempers over material movement by other trades which had also sometimes been damaged. The workers interviewed said that "workers don't care what happens to the other workers, because of the ill-will that has developed".

Another issue these workers raised focused on the long wait to exit the parking garage after work. The multi-story garage near the Theater provides parking for many City Center construction workers; after work it takes them up to 45 minutes to exit, and workers are concerned about the carbon monoxide buildup while idling. The workers feel that Perini should facilitate the exit of vehicles after work.

A corollary concern is that in the mornings, when driving to work on I -15 and exiting on Frank Sinatra Blvd, they are often required to come to a complete stop on the freeway, while traffic behind them approaches at well over 65 miles per hour. Workers are afraid that a sleepy truck driver will rear-end them while they are waiting in the slow lane to get off the interstate. Again, they feel that Perini should facilitate the movement of vehicles to avoid this hazard.

Other workers said they felt that Perini was trying to do the right thing regarding safety, but emphasized that before OSHA showed up the situation was a lot worse. They reported that housekeeping has improved since OSHA's arrival. A worker mentioned a specific incident when a "TC" bolt fell very near one of them. They explained that this bolt is one that "self-shears" when enough torque is applied to the nut, and this is work that is done by ironworkers. They said that falling objects are a big concern.

They mentioned that they knew three workers who suffered broken ankles from walking on the large gravel stones used in the roadways for the heavy equipment to drive on.

Another sheet metal worker stated that Perini fired two sheet metal workers for standing on the scissor lift hand railing while installing duct work. When they told Perini that they had to get on top of the duct work in order to make the connections, they were told to use extension ladders. However, the workers felt this was not as safe as standing on the scissor lift railings because of all the traffic on the ground and the reaching involved above. Apparently waivers signed by workers to use the scissor lift railings are permitted as long as they tie off. (At a debriefing session with Perini safety management, we were told that any such waiver or job planning waiver is not conducted with Perini, but perhaps directly with OSHA.)

One sheet metal worker said he's been working in the trade for over 20 years, that this was the first job he's been on where he really worried that he might get injured, due to what other trades were doing that he had no control over.

Interviews with electricians. One who has been on the job about a year said he had seen a Perini safety representative only once on the job. He compared this job to the Intel job he recently worked at, saying the difference was like night and day. He said at Intel the safety representatives would frequently talk with the workers, asking them what they could do to improve conditions, whereas at this job no safety representatives have spoken with him. He said that the Intel safety reps' practice of frequently talking with workers was a big positive, making workers feel appreciated and more aware of safety issues while they worked. He said that at Intel all the subs kept their work areas clean, all debris piles were roped off, that housekeeping was much better.

The other electrician who attended the Perini safety orientation about 4 months ago said he thought it was very negative, and he explained that the instructor made a show of dumping the badges of people who had been fired for safety violations on the floor in front of the class. The pile included the badges of foremen and supervisors. He said that the workers leaving that orientation left with a "me against them" attitude (paraphrase of the exact phrase he used).

An electrician said that subs have to police their own stuff, but that they don't do it. He said he's seen ironworkers working at elevation without being tied off, and other workers not using safety glasses. They both said that falling debris was a big issue, such as falling tools, materials, and sparks from welding and cutting overhead.

Interviews with carpenters. In their opinion the publicity about safety on the City Center site has been a positive thing. They said that things are really tight; whenever they need any PPE, it's no problem. They have daily safety meetings to discuss the day's work, and they routinely include safety issues in those meetings. They said that they have only had one minor injury, a small cut. They said that with so many workers on site scheduling problems are inevitable, and that there are always conflicts because

of that. But in their opinion, those conflicts haven't been too bad and they say that overall they would give the project a high safety rating.

Interview with an insulator foreman compared this job with his recent job at the Tahiti Casino. He explained that at Tahiti while he was carrying materials for his job, he had been required to pass by an open elevator shaft door that was only protected by warning tape. He said he had to threaten to stop work before they would actually install a railing barricade. Compared to that, he said, all the safety issues here have been taken care of.

While working at the Theater building an insulator was questioned by Perini for stepping off the elevated platform he was working on while insulating piping. He had been stepping on pipe racks, while wearing double "D" rings, meaning he was wearing a fall protection harness with two lanyards. He always was 100% tied off, going from one I-beam to another, but Perini told him he had to use extension ladders. He argued that extension ladders would be more dangerous than the procedure he was following because of all the traffic at the foot of the ladder, and that it would be safer to step off the lift while tied off.

He said that now if he writes up a procedure saying how they will keep 100% tied off and gets it approved by safety, they can do it. He did not specify what "safety" would approve this procedure, see comment above.

He described an injury of a worker with two lanyards who had disconnected one and instead of wrapping it around his waist, he let it dangle along. While moving to reposition himself, his feet got tripped up and he began to fall, however he arrested his fall by hooking his arm around a structural support, but he injured some tendons in his arm. His other lanyard was still tied off and presumably would have arrested his fall if it had continued.

An insulator foreman said that all in all, this job is really pretty safe.

Interview with the foreman of a sheet metal crew. He stated scheduling and pressure from top management were responsible for the safety incidents that have occurred. He described an incident where a piece of iron grating being installed by ironworkers had fallen. His crew had been cleared to work in this area while ironworkers were installing this grating. When his crew arrived, they found the area restricted because of the fallen material. He said that it was just lucky that the material had fallen before they arrived and began work. It could have fallen later and seriously injured them. He believes that the pressure to get work done was responsible for the go-ahead to work below the ironworkers while they were installing the grating.

A second concern he expressed involved inexperienced workers on the job site. He said they didn't know what they were doing, were untrained, and presented a hazard to other workers. He also said that communicating with non-English speakers was another problem because they often didn't understand safety warnings.

Interview with an ironworker installing curtain wall at the top of the Vdara building. He mentioned that they have PTPs (Pre Task Planning) every morning, and that generally they are 100% compliant with the safety procedures established for this job. He said that he might have to take his hard hat off for example to see around a floor or column while working, but that it's momentary, although that's just when they might take your picture. But he said they are always tied off while working the leading edge.

This worker complained repeatedly to Perini safety about toe-board blocks being fastened into the concrete deck with nails facing up. These 4 or 5-inch square plywood blocks are routinely used to hold down the bottom of the orange safety netting along the leading edge when placing the curtain wall. They are installed with power-actuated nail guns by placing the block against the concrete with the netting sandwiched in between, and firing a nail through the wood into the concrete. The worker reported they often are knocked loose, and the Perini safety people take them and instead of removing the exposed nail, they turn the block over and re-shoot it into the deck. This leaves the old nail exposed, facing up. This worker kneeled on one two weeks ago and had to go to the clinic.

Interview with a plumber who has been on the site for about a year and a half. He said that inexperienced workers on site are a big issue. He said he didn't know if they were just buying their cards and telling the union that they knew the work, or if they were travelers who came from residential work, but they were a hazard. He also said that heat was a big problem on the job. He said that just yesterday two of his co-workers were taken off site by paramedics due to heat stress. But generally, he said, this site is like any other.

Interview with Spanish-speaking masons patching in a stairwell. They said they thought things were pretty good, they haven't had any problems. They are aware that heat is a big problem and said they drink a lot of water, even when they are not thirsty. They said that safety is an individual responsibility, that each person has to be responsible for themselves.

One mason recounted that a Perini safety rep told him to take a scaffold out of service due to a defective wheel. He told his foreman about it, and it evidently took three days for his company to get replacement wheels, all the time Perini safety was threatening to "write him up." However, he said they did replace the wheel and it's OK now.

Interview with a Spanish-speaking carpenter. She said she didn't have any safety concerns, that she was very satisfied with safety on this job. She said her foremen are very strict about safety compliance because they don't want to get into trouble with Perini, and that she was happy to be doing carpentry work here.

Interview with sheet metal workers. Their main concern was that Perini was late getting them mechanical drawings. When they finally get the plans, there is almost

always other stuff in their way, and they tell Perini. They report Perini will come by and ask them if they're done yet, they'll say they're waiting for the material they told them about to be moved first, but always the question is, "Are you done yet? We need to get other trades in here." He said they definitely feel the pressure between getting the drawings late and hurrying up to finish, but that his own foreman is "cool," and doesn't get riled up very easily.

Interview with a glazier at the Cosmopolitan building. He was concerned about near misses. He said that glaziers hanging glass were on a swing stage scaffold when a two-by-four, 12 feet long, came sailing down like a spear from a floor above. While they were removing a "flyer" from a floor above, the piece of lumber was lost over the side. Flyers are what the workers call the pre-built platforms that are used to support a floor that is being poured. They are used in place of jacks, and once the floor is cured sufficiently, they are "flown" (rigged with a crane) out of that floor and "flown" into a floor above to repeat the procedure. He said that the real danger here was working below while above they were moving the flyer.

He also said that a co-worker had nearly been electrocuted by a live welding lead that had been left on the deck. His co-worker had moved a nearby coil of wire rope with his foot that, when it touched the welding lead, began sparking. He was fortunate that he did not use his bare hands to grab the wire rope, it could have come in contact with the welding lead and injured him.

Recurring themes from these interviews:

$ Scheduling of work such that workers are often placed in competing roles with other trades contributes to increased stress among the workers and safety problems. For example, attitudes have developed that are not conducive to collaborative work regarding safety. Workers are less likely to go out of their way to warn others of hazards, or to take action on their own on behalf of other workers. However, within crews there is a feeling of solidarity between trades. Workers are likely to think, "it's not my concern, I don't need to get involved," unless it's something that would impact one of their own crew.
Recommendation: Ensure project management considers safety issues, congestion, and competing interests when scheduling work. Elevate attention to "situation" hazards described earlier in the orientation section.

Work being permitted above other crews is also a contributing factor to hazards on these projects/jobs. There have been numerous complaints of falling objects and debris, and this is compounded by the vulnerability of workers below. Workers were placed as "watches" when certain tasks were performed overhead in order to keep other workers from walking below, however, this has apparently not been adequate to eliminate all the hazards of falling material.
Recommendation: Improvements in housekeeping should be made to minimize the risk of falling debris.

$ The heat buildup on floors that have been completely enclosed, especially when tile, plaster, or other wet work is being done, is having a largely negative impact on the workforce. The danger of this heat buildup is only slightly mitigated when industrial-rated circulating fans are provided on these floors. The problem is one of high desert heat, and the lack of natural ventilation that would reduce the humidity buildup which is exacerbated by Perini who has insisted on fully glazing each floor as the building rises, instead of leaving out glass panels that can be installed later (once the air conditioning in the building is functioning). The explanation from Perini that the LEED certification is the reason each floor is fully glazed as soon as possible is not sufficient.
Recommendation: Address ventilation needs arising out of implementation of LEED requirements for indoor contaminant control during construction. [2]

$ There is a feeling among the workforce that Perini safety is there to discipline workers who are not following the safety rules. This may contribute to an "us versus them" attitude among the workers, instead of a more collaborative safety conscious relationship.

These impressions are extrapolated from these few interviews that, of course, do not represent the entire workforce.

VI. Conclusions

A CPWR team performed a site visit to the City Center construction project site on August 14-16, 2008. The primary purpose of the visit was to better understand safety management and programs used by the Perini Building Company at both the City Center and Cosmopolitan construction projects, and to offer constructive feedback to improve safety and health on these projects. This site visit and report is one component of an overall worksite assessment being performed by CPWR as a result of an agreement reached between Perini Building Co.(General Contractor) and the Southern Nevada Building Trades Council (representing all site workers).

The visit included participation in the Perini site safety orientation session, discussions with Perini Safety and Health Management personnel, review of various Perini safety program materials, field observations to observe and accompany Perini safety personnel as they interacted with personnel on the site, and discussions with workers on the site. The visit and report also include the sharing of worker comments from the

[2] Section 8.1 of the US Green Building Council LEED criteria for indoor environmental quality calls for "Indoor Contaminant Control During Construction. (1 point) Seal off ducts during construction". Because this precludes the use of the ventilation system prior to building occupancy, there is a need to utilize some type of temporary ventilation system during the construction phase.

open-ended question portion of the workplace climate survey that has been conducted by CPWR as part of the overall assessment.

Perini Safety Program Management offered unfettered access to both the City Center and Cosmopolitan project sites. The site assessment team participated in the routine daily safety walks with Perini Safety staff to observe their interactions with subcontractors, foremen, superintendents and workers. The complexity of the site and time limitations limited the ability to comprehensively evaluate all issues. For example, the team observed the interactions of Perini Safety staff where problems were identified, but we were unable to observe follow-up, and what actions were taken to remediate some of the identified problems.

The resulting report includes a variety of suggestions and recommendations throughout. An Appendix is attached to highlight and summarize the recommendations provided. The report includes specific suggested solutions and sample talking points for improving upon the safety orientation. These include a suggestion to make a distinction between "regular" hazards and "situation" hazards to improve communication about hazards that arise out of different trades working in close proximity. Concerns about situation hazards were consistently reported by workers during unstructured interviews that were part of the site visit.

The report also includes a number of specific recommendations related to improving incident investigations. There is a need to improve the forms used for incident investigation to insure that they address relevant contributing factors. Suggestions for improving the investigations were also provided.

Several recommendations were provided about current safety committee meeting practices. These meetings can be utilized further to discuss and learn from incident investigation findings. Attendance at the meetings should be evaluated to insure appropriate participation. Perini Safety officials should further monitor trends suggested by safety committee reports to improve targeting of resources to recurring problems.

Worker comments from the open-ended question portion of the workplace survey provide several suggestions and feedback useful for improvement of safety, health, housekeeping, and safety management efforts at the site.

Worker interview information included in this report provides additional criticisms and complements that Perini Safety officials can use to improve efforts. Based on these interviews the team recommends that additional measures be taken to address scheduling and situation hazard issues, improve housekeeping efforts, and address ventilation deficiencies that arise out of measures taken to implement LEED requirements for indoor contaminant control during construction.

Our discussions with Perini Safety staff were extremely valuable in gaining insight into the workings of this unique and complex construction project and the workings of the safety program used to prevent and manage workplace hazards. It is our sincere hope

that the findings and recommendations from this report will provide useful input for stimulating additional efforts to further improve the safety and health program used for the City Center and Cosmopolitan projects, and for future projects conducted by Perini Building Company.

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APPENDIX - RECOMMENDATIONS

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