SCAFFOLD MANAGEMENT - A NEW ERA

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ABSTRACT

Scaffolding has been, and continues to be, a significant management problem at nuclear facilities. Four major areas of concern have been identified: 1) effective preplanning of scaffold requirements, 2) centralized control of on-site scaffold inventory, 3) back up of contaminated scaffolding, and 4) costs associated with back charges for lost scaffolding by contractors supplying their own and maintaining clean scaffold inventory. This paper addresses these problems through an integrated management plan of active participation in outage planning, computer tracking of inventory and manpower requirements, and elimination of contaminated scaffolding hardware inventory. Utilization of a new type, systems scaffolding, can result in significant reduction of man-hours for scaffold erection and dismantling of up to 50%. This can also correlate to reductions in man rem exposure, promoting the ALARA concept. Savings related to labor for erection and dismantlement are further enhanced through the preplanning and computer-generated drawings and materials of construction list. Specific discussion is included to address the identification of potentially contaminated material and how this material will be handled off-site, for future reuse at nuclear facilities, at a decontamination facility.

INTRODUCTION

Pending changes to 10CFR20, scheduled for implementation January 1, 1993, dictate additional reduction in radiation exposure. ALARA has been an ongoing primary objective of the industry with significant reductions being realized over the years. The success in reducing exposure can be attributed to specific programs directed at improving efficiency, training and reduction in general area radiation levels through operational methods, including system decontamination. With these ALARA efforts in full utilization any additional reduction in exposure requires concentrating on specific tasks or areas which have historically contributed to accumulated exposure. One of these areas where dose reduction can be realized is scaffolding erection and dismantlement, a task which is both labor intensive and time consuming. We have evaluated the different types of scaffolding available and the required labor effort and time associated with each type. This evaluation indicates a significant radiation exposure savings (ALARA) can be realized through proactive scaffolding program management and utilization of modular systems type scaffolding versus the standard tube and clamp predominant in the industry today.

BACKGROUND

Scaffolding will always be required in an industrial environment to meet access requirements for performing maintenance in a safe manner. For many years, scaffolding has been of the tube and clamp type and is the common scaffold material throughout the nuclear utility industry. With the introduction into the United States of the new modular systems scaffolding in the early 1980s, several industries which place a premium on reduced down time of production capability adopted the new modular systems scaffold technology. The labor and time saved, using the modular systems scaffolding, were immediate with considerable impact on down time and ultimate total cost of the production capability down period. This scenario of reduced scaffold erection and dismantlement has been reproduced in several industries including petro-chemical, pulp and paper, and in the non-nuclear electric generation industry.

Nuclear power generation has all of the same requirements of other production related industries plus a more important factor to consider. This factor is ALARA, a time based concept. Therefore, if the number of people required for a project is reduced and that reduced number of people spend less time in a radioactive area, the ALARA concept is served. As ALARA becomes even more a controlling factor in outage planning, every avenue to achieve man rem reduction will need to be explored. Scaffolding can be one avenue where the ALARA results are predictable with valuable benefits in labor savings and outage schedule improvement.

EVALUATION

With the introduction of state-of-the-art modular systems scaffolding specifically designed to reduce erection/dismantlement time and ensure personnel safety, actual comparisons to tube and clamp have been performed. The petro-chemical industry served as the proving ground and established the new type scaffold as essential to improving the efficiency of turnarounds (the petro-chemical industry equivalent of an outage). The time and labor reduction factor has been experienced throughout the petro-chemical industry and is now being realized by the pulp and paper industry. (See Figs. 1 and 2.)

The obvious advantage of modular systems scaffolding is less labor and time required for all projects requiring scaffolding. Of far greater importance to the nuclear industry is the impact of reduced personnel exposure and achieving ALARA. With any reduction in the number of people

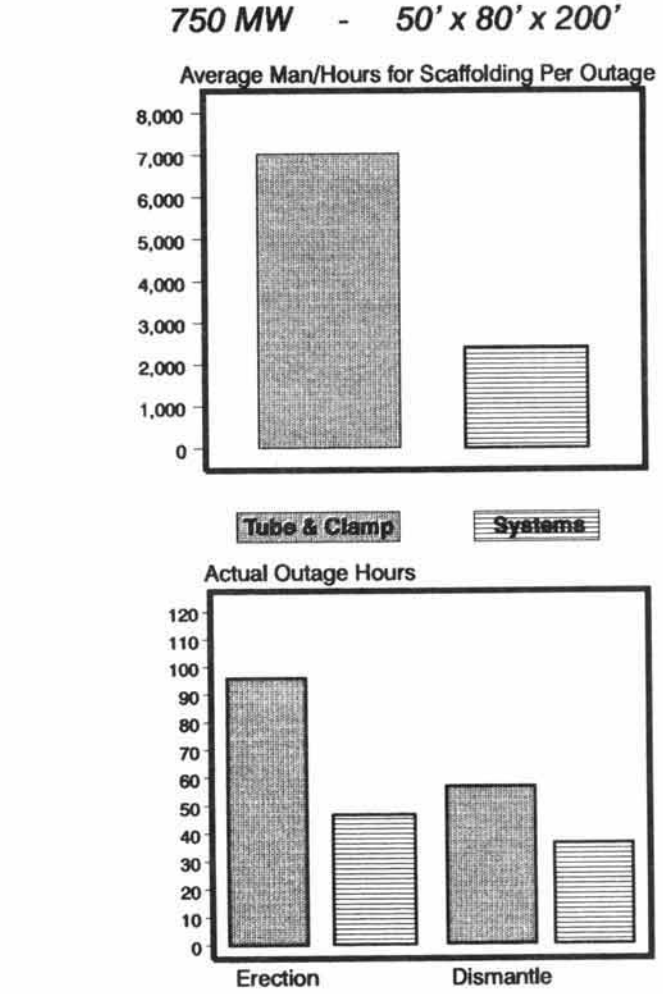

Fig. 1. Coal-fired utility boilers.

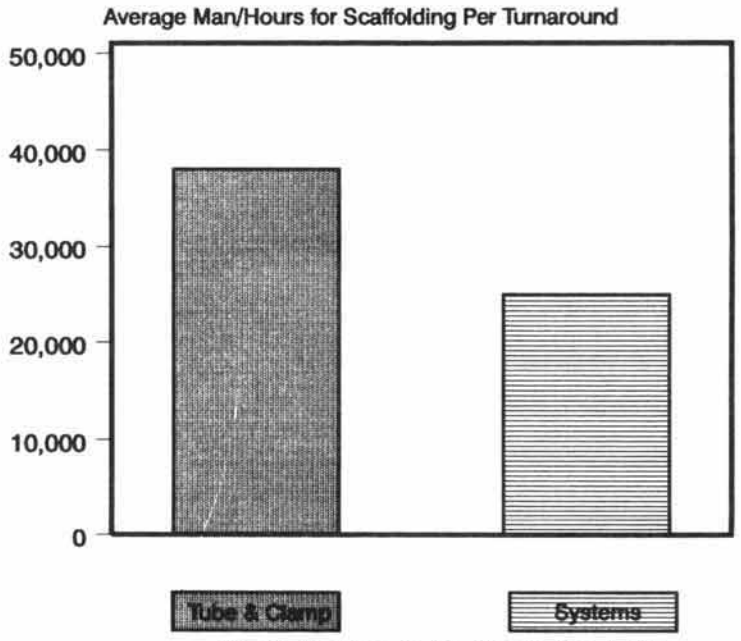

Fig. 2. Refining/petrochemical industry.

required and a reduction in the amount of time required in a radiation area, ALARA is enhanced. Utilizing the modular systems scaffolding instead of tube and clamp can result in a man-rem reduction of 30-50%.

In addition to evaluating the actual erection and dismantling time factors, it became obvious that the type and extent of preplanning also had an impact on labor, time and thus ALARA. The standard method of designing a scaffold and calculating the scaffold pieces required for a particular project involved a walkdown of the area, manual sketching the scaffold and figuring the quantity of pieces required from the sketch. In some cases, redundant scaffolding requirements were not identified, making it necessary to start from scratch each time an outage occurred. This approach is time consuming and does not provide an easy to read drawing or accurate materials list. Both the drawing and materials list have an obvious direct impact on erection time and personnel radiation exposure. Computer programs exist which will design a scaffold of any configuration to be OSHA compliant and provide an accurate list of materials required. This program when utilized with a Computer Aided Design (CAD) system, will produce an accurate drawing to which the labor force can refer during scaffold erection. This program provides for maintenance of a recoverable record of historic scaffold requirements used each outage.

ADDITIONAL ADVANTAGES

- 20-25% lighter than tube and clamp (reduced handling and shipments)
- Safer (all connections are fail safe)
- 60-65% fewer pieces required (reduced handling)
- Visual confirmation of locked connection (no wrench or torque wrench required)
- Adaptable with tube and clamp
- Neater final scaffold (no overhangs - safer)