

Table 1. BIM Trade Specific Safety Intervention Opportunities

BIM Safety Intervention Opportunities	Discipline/Trade
Design for Safety	All
Constructability Review	All
Site Specific Safety Plan	All
Job Hazard Analysis	All
Pre-task planning	All
Accident Investigation	All
Equipment move in planning showing openings in roofs and paths to be maintained clear for equipment move in buildings.	Mechanical and Electrical
BIM can be used to study and document ladder access through ceiling grid or access doors.	Facilities
BIM can be used to understand service access to above ceiling devices such as terminal units, fan coils and electrical pull boxes. If these devices are hard to access, they pose a safety issue during start up, service and maintenance. This is one of the major safety issues for maintenance professionals, and it can be corrected during the design stages using BIM.	Facilities, Mechanical, Controls, and Electrical
Access to fire smoke dampers has been ignored in several buildings and makes the maintenance personnel's life difficult leading to potential safety issues. Identification of areas where they need access platforms to service Fire Smoke Dampers can be identified using BIM models.	Facilities, Mechanical, Controls, and Electrical
<input type="checkbox"/> Consideration of safe and easy access for operators/maintenance staff to instrument control areas to take readings. <input type="checkbox"/> Proximity of gages to control valves. <input type="checkbox"/> Size and type of valves appropriate for operational concerns and facility operator. <input type="checkbox"/> Backup control systems identical: layout, gage location of board, valve size/type, etc.	Instrument/Controls
<input type="checkbox"/> Location of piping with hazardous material in relation to pedestrian and vehicular traffic patterns.	Mechanical

<ul style="list-style-type: none"> <input type="checkbox"/> Location of piping near electrical equipment. <input type="checkbox"/> Location of drain system. <input type="checkbox"/> Air intake location safe from external and facility (internal) generated air contaminants such as vehicles exhausts, forklifts, etc. <input type="checkbox"/> Pressure relief ports/valves located so not to cause additional damage to facility and/or personnel when activated. <input type="checkbox"/> Proper clearance for construction crafts to use aerial lifts to access and to install mechanical systems between tanks and walls. 	
<ul style="list-style-type: none"> <input type="checkbox"/> Access to and clearance to control panels to meet National Electrical Code (NEC) code requirements. Ensuring NEC 110 clearance on all panels. This code compliance usually gets overlooked and can be a big code issue if a mechanical/electrical room is designed and do not have 42" clearance and 6' clearance above electrical panels and equipment. This code compliance can be verified using BIM and any conflicts can be resolved before commencement of work. <input type="checkbox"/> Space in front (all sides) of panels for future expansion needs. <input type="checkbox"/> Parking and pedestrian lighting adequate for security concerns. <input type="checkbox"/> Proper lighting over emergency walkways and other walkways. <input type="checkbox"/> Adequate lighting for maintenance operations <input type="checkbox"/> Location of electrical panels in sight of related equipment <input type="checkbox"/> Overhead lines located not in laydown yards or in travel paths of cranes / over height loads. 	Electrical
<ul style="list-style-type: none"> <input type="checkbox"/> Location of fall protection anchor points for maintenance personnel. 	Structural

<ul style="list-style-type: none"> <input type="checkbox"/> Swing radius for gates/doors near sensitive equipment. <input type="checkbox"/> Fall protection on catwalks for maintenance personnel. <input type="checkbox"/> Guardrails and future tie-off points for fall protection can be identified using BIM model by looking at roofs, utility shafts, elevator shafts, and leading edges for fall hazards, etc. <input type="checkbox"/> Location of covered structural members (i.e. post tension cables) for future needs for wall or floor penetrations. <input type="checkbox"/> Access location of roof, tank, confined spaces, etc., ladders vs. stairs (enclosed, fall protection, hands free) for facility maintenance, cleaning, etc. <input type="checkbox"/> Mitigate trip hazards and head knockers 	
<ul style="list-style-type: none"> <input type="checkbox"/> Egress route/exits not near or by hazardous operations. For example, exit door away from traffic. <input type="checkbox"/> Showers, AED's, trauma kits, air supply/emergency respirator near needed operations. <input type="checkbox"/> Sound barriers around noisy equipment. <input type="checkbox"/> Emergency control valves easily accessible. <input type="checkbox"/> Emergency monitors located in correct and accessible location. <input type="checkbox"/> Traffic flow considered separating equipment from pedestrian. 	Life Safety