RISK BULLETIN 2020

ALLIANZ GLOBAL CORPORATE & SPECIALTY®

SAFEGUARDING OF CONSTRUCTION SITES DURING A CESSATION OF WORKS

LOSS PREVENTION MEASURES FOR CONTRACTORS

ALLIANZ RISK CONSULTING

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Work stoppages can occur on construction projects for a variety of reasons including bankruptcy, principal's insolvency (contractor not paid), decision of public authorities, infectious disease, natural disaster, etc. To minimize project losses it is critical that actions are taken to protect the project in a thoughtful and deliberate way.

All of the recommendations are technical advisory in nature from a risk management perspective and may not apply to your specific operations. Please review recommendations carefully and determine how they can best apply to your specific needs prior to implementation. Any queries relating to insurance cover should be made with your local contact in underwriting and/or broker.

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Topic	Project Concern	Potential Action to be Taken
Security	Secure project site	Prior to leaving the jobsite, ensure that the project is secure. Secure the site perimeter with appropriate fencing as a first line of defense. Maintain a clear zone adjacent to fencing wherever practicable. Illuminate the jobsite perimeter fence, high value storage areas, building entrances and site offices to effectively deter trespass, theft and vandalism. Control site access by establishing the minimum practical number of access points and monitor those entry points. Put in place adequate explicit signage prohibiting access to the worksite and warning of dangerous conditions.
	Liaise with local law enforcement	Liaise with local law enforcement agencies to assess the risks and determine if they will provide any protection during the stoppage.
	Video monitoring with notification	If permanent security personnel cannot be provided, consider installing a video monitoring system with advanced video analytics capability designed to detect and alert in the event of intrusion, vandalism, theft and fire. Consider a remotely monitored system with notification to authorities and management personnel in the event of an incident. Many such systems also can incorporate water leak detection.
	Visit the site routinely	During the work stoppage, have personnel regularly visit the project to ensure protection measures remain in place and if problems have arisen, immediately take measures to prevent losses.
	Responsible person in charge	Designate contact persons for handling issues or damage reports. Appoint a coordinator for actions to be taken by key management personnel.
	Last person to leave	Designate a manager in charge that will be the last person to leave the site to ensure that all temporary measures are implemented.
	Security Logbook	Record the above checks in the security logbook.
	Additional guidance document	For additional guidance, please see our document *Construction Site Security, A Contractor's Loss Prevention Guide*. *(https://www.agcs.allianz.com/content/dam/onemarketing/agcs/agcs/pdfs-risk-advisory/risk-bulletins/ARC-Construction-Site-Security.pdf)*
Materials	Material deliveries	Consider suspending the delivery of materials if they cannot be properly protected, ensure that materials in transit are stored in a safe location, and have subcontractors do the same.
	Protect materials	Confirm the safe and dry storage of moisture-sensitive building components, including wooden structural elements.
	Relocate materials	Consider temporarily removing valuable building materials to a secure area.
	Material packaging	Secure all packaging and materials that could be adversely impacted by weather (i.e. high winds).

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Site Utilities / Hazardous Materials	De-energize power	When prudent, de-energize power (especially temporary electrical service) at the circuit breakers, as close to the main power breaker as possible. Unplug all electrical equipment. Secure access to the electrical breakers via a physical lockout of panels and cabinets.
	Water	When prudent, the potable water supply should be shut off at the main(s) and tanks and plumbing drained. If water service must remain, then installing an automatic water-monitoring device that will alert a responsible person and automatically shut off the water should be considered. If water remains then the piping must be drained or protected from freezing. If fire protection water is impaired, it should be with the explicit acknowledgement and approval of local fire authorities.
	Gas	When prudent, shut off gas to the project site and notify the provider. Secure access to main gas valve.
	Compressed air systems	Depressurize, remove/isolate compressors and piping systems.
	Liquid fuels	Shut off and consider emptying the fuel forwarding system.
	Coal	Empty conveyors. Consider self-ignition properties in the bunker. Depending on analysis, relocate/empty bunker.
	Chemicals	Remove, secure, isolate or neutralize chemicals to prevent their release or their reaction together, if disturbed.
	Flammable liquids and gases	Ensure all flammable liquids and gases are removed from the site, including oxy-acetylene.
Site Housekeeping	Construction debris	To mitigate the risk of a fire loss, it is recommended that all paper, cardboard cartons and other combustible materials (wood, sawdust, trash, etc.), be removed from the construction areas prior to vacating the site.
	Waste containers	Empty all waste containers
	Animal and insect infestation	Protect works from the risks of animal and insect infestation (such as rats, birds, termites, etc.).
Building Services Equipment	Protection of equipment in place	It is critical that building services and equipment are protected in the event of work stoppage. The delivery of equipment to the jobsite should immediately be delayed until the project is resumed. For equipment already onsite, where appropriate, cover the stored equipment with fire-resistive covers or suitable sheeting to provide added protection. Consider the storage and protection requirements for each type of equipment following any OEM recommendations. Ensure that storage areas are protected from water ingress and leakage. Often, contractors store equipment in the lower levels of the basement so as not to interfere with ongoing construction. Be aware that in the event of a water leak (unexpected plumbing/sprinkler failure, chiller lines separation or building envelope openings) the basement often becomes flooded. Consider locating equipment above the lowest level and, if possible, above the maximum flood level to minimize the risk of water damage. Theft-prone equipment should be stored in lockable rooms or containers and security personnel should make rounds to deter theft.

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Building Services Equipment	Relocation of equipment	Consider the relocation of equipment. When storing equipment in offsite locations, the locations should be carefully selected with consideration given to natural hazards, fire, theft, temperature and humidity, etc.
	Equipment in subcontractor care	Remember to consider protecting equipment in the subcontractor's care. Note that it is important for the contractor to ensure proper handling and care of equipment by the subcontractor. Often, contractors do not consider the protection of equipment while offsite and in the subcontractor's possession to be a project exposure; however, this is often an incorrect assumption. Many losses to contractor equipment occur while in the custody of the subcontractor or stored offsite. With long-lead equipment, such losses can delay project completion, resulting in a costly loss and owner dissatisfaction.
	Maintenance of equipment	Depending on the duration of storage, maintenance of equipment may be required. Consult the manufacturer regarding equipment maintenance requirements while in storage and perform all recommended activities.
	Additional guidance document	For additional details, please see AGCS's document, Installed Building Services and Equipment, A Contractor's Loss Prevention Guide. *(https://www.agcs.allianz.com/content/dam/onemarketing/agcs/agcs/pdfs-risk-advisory/risk-bulletins/ARC-Installed-Building-Services-And-Equipment.pdf)*
Machinery and Equipment	Critical equipment	Address the most critical equipment first when defining priorities for loss prevention measures, particularly when under time pressure. Measures of criticality include potential damage and potential delay (lead time of spares).
	Protect equipment during erection	Principle: keep dry and clean • Protect against rainwater, dust and foreign objects Use tarpaulins for protection as a quick fix. • Consider condensation caused by temperature variations. Consider drainage • Follow OEM recommendations for preservation. For more specific details on conservation, moisture protection and preservation of machinery and equipment, refer to the following sections in the Appendix: 1. General Technical Details on storage and conservation 2. General comments regarding onsite preservation of installed components
	Inspection of preservation measures	Organize daily rounds for inspection of preservation measures. Define responsibilities for rectifying defective preservation in order to guarantee immediate remedial measures.
	Review and update preservation measures	Such measures will depend upon: • The timeframe for preserving equipment and thus thoroughness of the preservation measures and • The duration of the erection interruption Preservation measures should be reevaluated (e.g. after 4 weeks) and, if necessary, revised, if the interruption period is longer than expected or if preservation measures are found insufficient.

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Machinery and Equipment	Industrial equipment	For industrial equipment, make sure all shutdown procedures are followed in accordance with the manufacturer's specifications and recommendations to prevent damage upon restarting.
Construction Equipment	Construction equipment relocation	Relocate project equipment that can be moved to a safe location. Secure the equipment that cannot be relocated.
	Tower cranes	Contact the tower crane subcontractor, manufacturer and/or operation personnel regarding preparing the tower crane for stoppage. In the event that the tower crane will not be demobilized, ensure the crane is properly braced, lock access and put in weathervane mode (i.e. slew breaks released, trolley left in inner position and hook raised with no load) to prevent lateral loadings. Check if the grounding is still intact. Define a necessary interval for inspection of tower cranes.
	Lower crane elements	All crane booms, buckets and blades should be lowered to the ground.
	Hydraulic cranes	Hydraulic cranes should have booms retracted and stored.
	Hoists	Ensure hoisting equipment conforms to all manufacturers' recommendations, including the placement and removal of advertisement banners and the use and/or removal of rigging. Any counterweighted hoist should have the counterweight locked below the top tie-in.
	Remove/secure small portable equipment	Remove portable equipment from the jobsite, or store it in locked shipping containers.
	Contractor's specialty equipment	Maintain all specialty equipment in accordance with the manufacturer's recommendations. In the event that specialized equipment is idled, ensure that it is left in such a condition that it can be restarted when work resumes. Please contact your AGCS risk engineer for recommendations regarding contractors specialty equipment such as tunnel boring machines, concrete pumping equipment, HDD drilling equipment, etc.
Partially Completed Work / Temporary Structures	Completion of work	If possible complete portions of the work in such a way as to reduce rework and losses when the project resumes. For example: • Complete concrete placements to prevent cold joints • Finish mud slabs as a means to cutoff water from below foundations • Complete temporary roof structures to prevent water damage • Complete and or secure structural frames to prevent instability
	Brace and fortify temporary structures	If completion of structures is not possible or new construction is not fully strengthened, install and fortify temporary bracing to the greatest extent possible.

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Partially Completed Work / Temporary Structures	Structural engineering inspection	Prior to leaving the site, have a structural engineer perform a visual inspection of works and comment on topics related to structural integrity, based on the current status of construction and considering the potential stoppage period. This could include construction joint positions, the presence of a structural core to support/stabilize the portion that has been constructed, support to critical members, etc. Additional bracing and support elements may be required to protect the structure during the stoppage. Many "temporary construction elements" allow for a reduced factor of safety. In the event of an impending stoppage, the factor of safety should be re-evaluated prior to demobilization. Mitigation measures should be implemented.
	Engineering formwork and falsework inspection	Prior to leaving the site, have an engineer perform an inspection on formwork and falsework currently in place. Mitigation measures should be implemented, if applicable.
	Fire protection consultant inspection	Prior to leaving the site, have a fire protection consultant perform an inspection of the works to identify potential exposures, based on current status of project. These could include structural elements for which fire protection has not been applied, fire barriers which have not been completed, etc. Mitigation measures should be implemented.
	Newly placed concrete protection	Protect newly placed concrete, not completely cured and at its design strength. This concrete must be covered with a curing compound and/or ponded and covered with plastic sheets to prevent excessive loss of moisture. Additional considerations should be given to temperature protection of concrete, premature loading, etc.
	Structural steel protection	Protect structural steel elements from damage during the stoppage. Mitigation measures should be implemented.
	Earthwork protection	Protect the integrity of soil underlying foundations to avoid affecting the bearing capacity of the soil and subsequent differential settlement of foundations. Temporary drainage measures should be implemented or foundation excavations to be backfilled.
	Steel oxidation protection	Protect exposed reinforcing steel from oxidation whether in-place or stockpiled.
	Scaffolding removal or inspection	Check all scaffolding and remove if not necessary. For scaffolding which will remain, check the condition on a frequent basis. It is always prudent to rely on recommendations by the project engineer or local authorities.
Natural Hazards	Consider seasonal natural hazards	Be aware that the stoppage could expose the project to seasonal events that may subject the works to forces which were not anticipated, such as snow loads, hurricane force winds, freezing, monsoon seasons, etc. Consider the consequences of these events on the uncompleted works.
	Water infiltration	Protect the structure from water infiltration to the greatest extent possible. Protect and/or remove materials which are highly susceptible to water damage. Provide a storm resistant protection for the building envelop and roof openings. Remove or protect all water-sensitive materials near a roof or building opening or move them to a dry storage location. Ensure drainage pipes are functional and discharge away from the structure and critical works.

Topic	Project Concern	Potential Action to be Taken
Dewatering	Inspection and dewatering	Do a full inspection of the worksite to prevent the risk of water intrusion. Consider installing temporary protection if necessary and ensure that pumping/de-watering devices will operate during the suspension.
	Maintain dewatering as needed	If dewatering efforts must persist, ensure daily checks of operation and alarms. Test the emergency generator operation regularly and ensure adequate fuel is available.
Excavations	Excavation slope	Adjust slope of excavation to prevent sloughing/collapse due to heavy rainfall.
	Water infiltration	Deep excavations should be protected to prevent water infiltration resulting in geotechnical instability. In addition, pay special attention to ventilation shafts and station entries for underground projects which should be protected against possible water ingress from the surface (in a case of flood or heavy rainfall).
	Hydrostatic forces	Consider taking measures to prevent excessive hydrostatic forces from developing behind excavation structural elements. Examples include buoyancy on below grade building elements and the effects of lateral forces on uncompleted excavation structural components.
	Stability of retaining structures	Ensure that partially completed retaining structures are supported so that they will remain stable during the stoppage period. Consider that temporary supporting structures such as strutting, bracing, etc. may be required.
Trenches and Roadway Sections	Open trenches	If needed, refill trenches to avoid the risk of collapse with damage to existing cables and pipelines.
	Shoring and protection	If trenches will remain open ensure adequate shoring and protection is in place.
	Subgrade protection	Protect the subgrade of service trenches and roadway sections on the project site by covering the areas and implementing temporary drainage. Saturated subgrades when subjected to cyclical loadings could experience adverse settlement over time.
Project Offices	Secure site offices and utilities	Clean, secure and lock the site offices. When applicable switch off electricity, heating and water supply.
	Information protection	Assure that all essential building information is safely stored, secured and backed up.
	Protect offices from damage	When monitoring the project site, include inspection of the project offices, shops and storage areas.
Notification	Insurer and broker notification	Notify the insurer and broker regarding the projects to be stopped and the anticipated duration of stoppage.
	Maintain access and communication	Define and communicate responsible person(s) who will provide for the management of communication and access of to the project site. Maintain an emergency phone list for all personnel and key subcontractors. The phone list should be kept current and should include both work-related and personal home numbers, cell phone numbers and email addresses.
	Display contact details	Display contact details (general contractor, project management, owner) in a clearly visible area in the event they must be contacted (third parties, authorities, firefighters, police, etc.).
	Stoppage notification	Formally notify all interested parties of the closure of the worksite by the general contractor and the date on which access will be prohibited. Prepare an updated project schedule.

Topic	Project Concern	Potential Action to be Taken
Notification	Documentation of actions taken	Maintain records of all inspections, isolations and lockouts, etc., including identification/assigning responsibility for recordkeeping for a particular project.
Project Restart	Recheck formwork, falsework and scaffolding	Prior to restart, all formwork, falsework and scaffolding should be inspected to ensure that they are plumb and level, that bolts are in place, that bracing is secured and that construction elements are adequate for their intended purpose.
	Testing and inspection	Consider what additional testing and inspections may be required prior to restarting the project.
	Utilities	When recommissioning, inspect the condition of MEP (electrical, water and gas systems) systems prior to energizing or pressurizing. Examples might include inspecting piping, conductors, plumbing systems, electrical devices, etc.
	Engineering inspection	Have all engineering disciplines (structural, mechanical, electrical, geotechnical, etc.) inspect their respective works prior to resuming construction to confirm the project integrity.
	Insurer and broker notification	Notify the insurer and broker when a project is being restarted.

APPENDIX

1. General Technical Details on storage and preservation

The most common metals such as iron, copper, zinc and aluminum must be protected against atmospheric corrosion and condensation corrosion in order to maintain their serviceability. In general, for the above metals, a noticeable corrosion reaction with air (without oxidizing gases) occurs, if the relative humidity of the air > 70 %. In order to prevent corrosion of equipment made of the above metals during storage and shutdown, various preservation measures can be taken. Essentially, these measures are dependent on the preservation period as well as the specific component or plant part:

- Dry preservation: During dry preservation, the relative humidity of the surrounding air is reduced, e.g. < 40 %rel. humidity.
- Wet preservation: (water with specified pH value, conductivity, etc.).
- Coatings: Application of organic protective films.
- Volatile corrosion inhibitors: Use of VCI (volatile corrosion inhibitors) liquids or papers.
- Corrosion protection oils: Temporary protection.
- Other appropriate preservation methods may be applicable.

It should be noted that long-term preservation, e.g. over 2 years, is usually more complex and expensive.

2. General comments regarding onsite preservation of installed components

For preservation of any duration, a strategy needs to be developed to align costs with economic efficiency. Plant components with a high to very high replacement / refurbishment cost or which are business critical, should be considered first for preservation. In addition, a procedure for control, storage and maintenance of materials and equipment must be developed. If there are no preservation instructions from the OEM for the components or system parts concerned, general preservation guidelines can be used; refer to the Resources listed below.

Considering warranty requirements, the OEM's preservation instructions should be followed or the OEM retained to conduct relevant preservation measures. For successful preservation, it is essential that the preservation measures are inspected and recorded on a regular basis, e.g. weekly. If any specification deviations are discovered, a responsible person should be appointed to perform remediation. These remedial measures must also be recorded in order to trace all preservation measures carried out.

For additional guidance, please see our document AZT Product Info Preservation Of Process Plants:

https://azt-industry.com/_Resources/Persistent/ecb7f913c37183be3de3db75e32f712b1ff805a0/18_azt_produkt_info_02_2019_web.pdf

Resources

1. MIT Publication No. 34: Guidelines for the Mothballing of Process Plants, Materials Technology Institute of the Chemical Process Industries, Inc., Published of Corrosion Engineers, 1989.
2. VGB-Standard: VGB-S-036-00-2027-04-EN, Preservation of Steam and Gas Turbo-Generator Sets - 2nd Edition
3. VGB Standard: VGB-S-116-00-2016-04, Preservation of Power Plants

CONTACT

If you have further questions, please contact your local AGCS underwriter or market manager.

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