

WYSSEN AVALANCHE TOWER

EXPLOSIVE USE PROCEDURES

Table of Contents

1.0	Introduction	2
2.0	Equipment for Blasting	3
2.1	System Components.....	3
2.2	Explosive Charge Components (Materials Per Charge)	3
2.3	Accessory Tools	3
2.4	Other.....	3
3.0	Documentation	6
4.0	Personnel Roles and Responsibilities.....	7
4.1	Training and Certification	7
4.2	Personnel	7
5.0	Operational Procedures.....	8
5.1	Pre-Season Commissioning.....	8
5.1.1	Preparation of the Deployment Box	8
5.1.2	Explosive Charge Construction	9
5.1.3	Loading the Deployment Box with Explosive Charges	10
5.1.4	Test run with Operating Buttons.....	10
5.2	Transportation of the Deployment Box by Helicopter	11
5.2.1	Pre-planning for Helicopter Transportation.....	11
5.2.2	Helicopter Attachment.....	11
5.2.3	Placement of the Deployment box on the Tower	12
5.3	Live Testing and Operational Use	13
5.3.1	Area Closure.....	13
5.3.2	Firing the System.....	13
5.3.3	System Malfunctions.....	14
5.3.4	Misfire Procedure.....	14
5.4	Post-Season Decommissioning	15
5.4.1	Return Transportation of the Deployment box by Helicopter	15
5.4.2	Unloading Explosive Charges from the Deployment box.....	16
5.4.3	Charge Disassembly.....	16
5.4.4	Preparing the Deployment box for Storage	17
5.5	Emergency Procedure - Dropped Deployment box	17
6.0	Closure.....	19

1.0 Introduction

Wyssen Avalanche Towers (WAT) is used for avalanche control [location(s)]. A WAT is a remote avalanche control system (RACS) that an avalanche technician uses to deploy explosives into an avalanche starting zone. The system is operated from a safe location [on the highway/road/location] by means of a digital interface (e.g. tablet or laptop computer) connected to an encrypted communication system (e.g. radio, GSM). Explosives are dropped by remote mechanism from a removable deployment box installed at the top of a tower, and are suspended several metres above the snow surface. The deployment box holds up to twelve explosive charges (up to 5 kg) that are detonated individually.

These procedures describe blasting equipment used with the WAT, personnel training, the assembly and loading of explosives in the tower deployment box, flight operations for transport of the tower deployment box by helicopter, deployment of the explosives using the remote system, and misfires.

Procedures are in accordance with the following:

- WorkSafe BC (WSBC) Occupational Health and Safety Regulations (OHSR)
 - Part 21 – Blasting Operations
 - Part 29 - Aerial Operations
- Natural Resources Canada Explosive Regulations
- Transportation of Dangerous Goods Regulations Part 12.12 – Aerial Work
- Wyssen Avalanche Tower LS12-5 G3 Instruction Manual (v 3.8, July 2017).

2.0 Equipment for Blasting

The WAT system components and the equipment used for the assembly, loading and transport of the explosives and tower deployment box are listed below. Further detail of the system components can be found in the WAT Instruction Manual, Wyssen Avalanche Control (2017).

2.1 System Components

- Wyssen Avalanche Tower LS12-5 G3;
 - The tower deployment box (Figure 1);
 - The complete Wyssen Avalanche Tower (Figure 2);
- Wyssen Helicopter Latch HK-02 (Figure 3);
- Web-enabled device (PC, notebook, tablet, smartphone)
- WAC.3 base for radio communication with avalanche tower

2.2 Explosive Charge Components (Materials Per Charge)

- Explosives charge (up to 5 kg);
- Safety fuse assemblies, 30 cm (variance [IR#xxxxxxxxxA]), 2 units;
- Wyssen percussion fuse lighters, 2 units;
- Wyssen charge container, 1 unit;
- Cord, 3 mm, approx. 7.5 m in cord sack for charge suspension, 1 unit;
- Wire hooks for connecting pull wire lighters to cord, 2 units;
- Retaining ring to connect suspension line to the cable dropper, 1 unit;
- RECCO reflector, 1 unit. (optional)

2.3 Accessory Tools

- Fuse cutters;
- Punch tool;
- Eye protection;
- Gloves

2.4 Other

- Portable radio(s)
- Keys for WAT deployment boxes and control unit
- Locks for WAT deployment boxes
- Container for safety fuse assemblies
- Quality control checklist

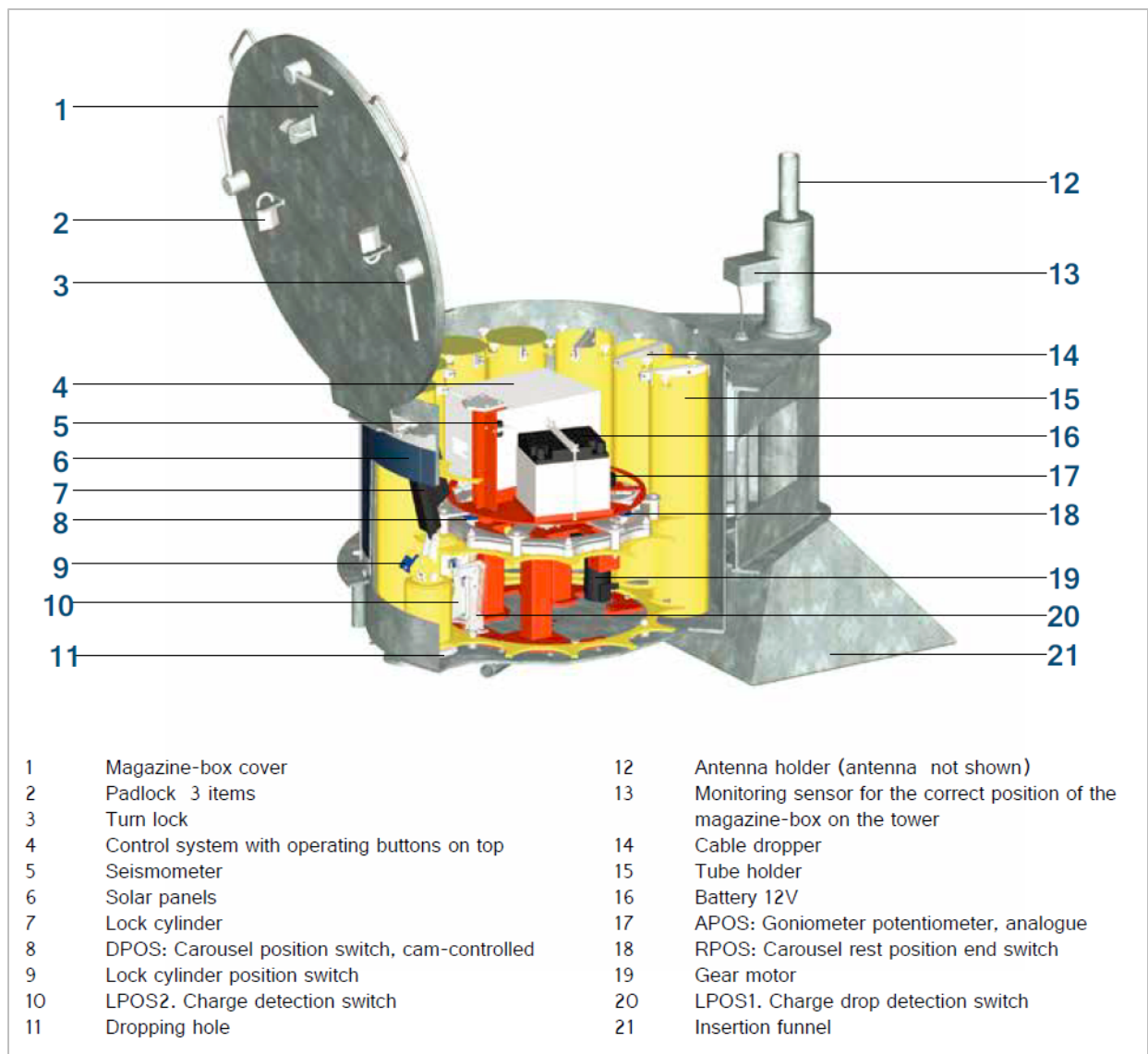


Figure 1. Components of the tower deployment box.

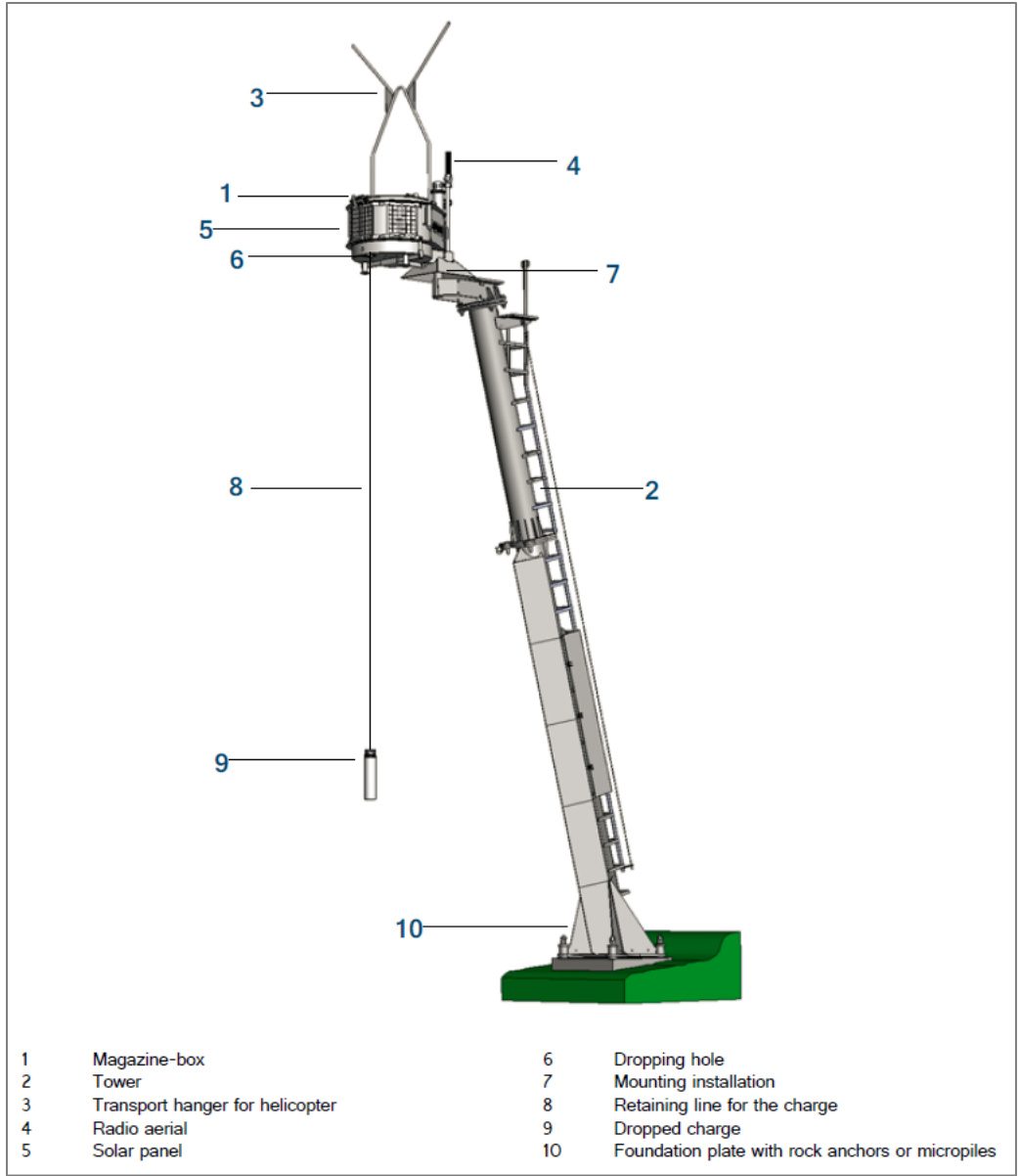


Figure 2. Components of the complete Wyssen Avalanche Tower system.



Figure 3. Wyssen Helicopter Latch HK-02.



Figure 4. Assembled WAT explosive charge.

3.0 Documentation

Inspection, testing, maintenance, loading, and use of the Wyssen Avalanche Towers will be carried out in accordance with the manufacturer's recommendations and following the standard procedures outlined in the WAT Instruction Manual, including recommendations for:

- Charge construction;
- Loading and unloading the deployment box with explosive charges;
- Transport of the deployment box by helicopter;
- Seasonal recommissioning and decommissioning; and
- Maintenance.

The maintenance section of the manual includes inspection and maintenance instructions, maintenance schedule and procedures in case of a malfunction. The supplier provides a 24-hour telephone service in the case of a system malfunction.

Records of inspections, pre-season and post-season maintenance, and testing will be maintained. A copy of the Avalanche Safety Plan, WAT Instruction Manual and Explosive Use Procedures will be kept at the work site and made available to technicians using the system.

4.0 Personnel Roles and Responsibilities

4.1 Training and Certification

Personnel who perform charge assembly, loading, coordinating aerial transport and operating the WAT (either for testing or operational use) will have the following training and certifications:

- Site orientation;
- WHMIS training;
- TDG certification;
- WorkSafe BC blasting certificate for avalanche control (required for the Blaster of Record);
- Wyssen Avalanche Tower specific training provided by an authorized Wyssen representative, covering the following topics:
 - System components, including maintenance and function tests;
 - Communication system operation and tests;
 - Pre-season maintenance requirements;
 - Charge assembly and loading;
 - Aerial transport operations;
 - Misfire procedures; and
 - Post-season decommissioning.

4.2 Personnel

The avalanche control team consists of a Blaster of Record (Team Leader) and Assistant(s).

The **Blaster of Record** will be an experienced person meeting the training and certification requirements listed in Section 4.1 of these procedures. The Blaster of Record is responsible for safety of the entire operation, including the direct supervision of all aspects of the assembly of charges, loading, testing, operational use and unloading of explosives during post-season decommissioning.

The **Assistant(s)** is responsible for assisting the Blaster of Record with the same tasks described above, as well as observing for anomalies during assembly and loading of explosives.

If the assistant does not hold a valid blasting certificate, the Blaster of Record is required to visually supervise the assistant and is responsible for their work during assembly and loading of explosives.

Any member of the blasting team has the responsibility and authority to call a halt to the procedures if they believe that worker safety is, or is likely to be, compromised.

Additional personnel includes the **Pilot** who is responsible for the operation and safety of the aircraft.

A copy of the WAT Instruction Manual will be kept at the work site and made available to technicians using the system.

5.0 Operational Procedures

The operational procedures are presented in three sections for each of the following periods of use: commissioning the system at the start of the season, operational use and decommissioning the system at the end the winter season. Personnel performing the tasks described below will meet the training and certification requirements list in Section 4.1 of the procedures. A Blaster of Record will be designated for explosive charge assembly, loading, helicopter transport of the deployment box, testing and operations.

5.1 Pre-Season Commissioning

Prior to the start of each winter season, several tasks are required to prepare the system for use. This includes inspecting all system components, assembling the explosive charges, loading the deployment boxes and transporting the deployment boxes to the towers.

The charge assembly and loading area will be at least 50 m from inhabited areas and publicly travelled roads. This area will be secured during arming of the system to prevent unauthorized access.

5.1.1 Preparation of the Deployment Box

1. The docking system spike on the tower is to be cleaned and greased. Smooth out any irregularities, burrs, or edges with a coarse file. Apply a thick layer of waterproof and low temperature grease to the spike (grease brand/properties approved by Wyssen).
2. The battery(ies) on the deployment box are charged with a voltage of 12.8 V.
3. Position the deployment box to ensure that there is not more than 30 cm of free height below the bottom of the deployment box (deployment hole).
4. Prior to loading, each deployment box is located such that it is moved less than 50 m to the helicopter attachment point.
5. Open all padlocks on the cover and turn the locking level through 90°.
6. Lift the cover using handles provided until the safety catch engages.
7. Set all sliders of the cable droppers into the rear (open) position.
8. Remove the tube holder covers.
9. Remove cable droppers from the tube holders.

5.1.2 Explosive Charge Construction

1. Preparation of the charge container:
 - a. Insert the explosive cartridge(s) into one half of the plastic shell. Ensure the cartridge(s) sits at the bottom end of the plastic shell.
 - b. Snap the second half of the plastic shell together with the first one, starting with the tabs at the bottom of the shell working upwards.

2. Preparation of the retaining cord:
 - a. Guide the retaining cord through the four holes on the top end of the plastic shell join the two ends with a Flemish bend (aka Figure-8 follow-through knot).
 - b. Release the cord attached to the back of the pre-assembled cord sack and then fasten the sack with a grith hitch to the retaining cord.
 - c. Clip the spring hooks into the eyelets of the percussion fuse ignitor and insert the cord sack with the end (ring) on top.
 - d. A quality control inspection is conducted for each charge by a second trained person, completely independent of the construction process. This inspection will confirm the charge is assembled correctly following the procedure described above.
 - e. The inspecting person places a RECCO reflector on the inside of the charge container.
 - f. The inspecting person then places the foam stopper on the top of the cord sack to secure the inserted retaining cord and percussion fuse ignitor.
 - g. Charges are temporarily stored in a secure manner, e.g. in the charge container box.

3. Preparation of the safety fuse:
 - a. Prepare the safety fuse assemblies by cutting the fuse to a length of 30 cm measured from the crimp. Only cut safety fuse assemblies as needed to assemble a charge. Then move on to the next charge. Do not precut safety fuse assemblies.

4. Priming of the charge:
 - a. Loosen the screw sleeves at the bottom of the percussion fuse ignitors by approximately 1 turn and remove the plug. Do not unscrew completely. Hold the ignitor at the top with one hand to prevent twisting. **NOTE: If the ignitor should be completely unscrewed, do not reassemble; this ignitor must not be used.**
 - b. Push the free end of the safety fuse assembly fully up into the ignitor and firmly tighten the screw sleeve (compression fitting). Hold the ignitor by the lug with one hand while tightening the screw sleeve in order to prevent twisting. Repeat for the second safety fuse assembly.
 - c. Pierce explosive cartridge(s) with the punch tool through the side holes in the plastic shell and insert the detonator on the safety fuse assembly securely into the cartridge. Repeat for the second safety fuse assembly.

- d. Clip the safety fuse assemblies into the plastic clips on the inside of the plastic shell.
- e. A quality control inspection is conducted for each charge by a second trained person, completely independent of the construction process. This inspection will confirm the charge is primed correctly following the priming procedure described above.

5.1.3 Loading the Deployment Box with Explosive Charges

1. Bring the prepared explosive charge to the deployment box and set it down on the surface next to the flashing light. The prepared charges should never be handled or transported one-handed.
2. Carefully remove the foam stopper from the charge while ensuring the retaining cord stays in place.
3. Take hold of the explosive charge on the inside of the plastic shell through the holes at the upper edge of the tube and carefully insert the charge into the tube holder, beginning with Tube #12 and working in descending order.
4. Attach the ring on the end of the retaining cord to the cable dropper by inserting the ring into the center slot on cable dropper and push the slider to the front extended (closed) position, which holds the ring. The slider is released into the front position by pressing the metal pin at the bottom of the cable dropper.
5. Lay the cable dropper into the notches of the tube holder so that the ball bearings point to the center of the deployment box. Both recesses in the cable dropper must lie within the tube holder to prevent the cable dropper from shifting.
6. Ensure the retaining ring is correctly mounted in the cable dropper. After this check, avoid touching the cable dropper.
7. Once the deployment box is fully loaded, a quality control inspection is conducted for each charge by a second trained person, completely independent of the construction process. This inspection will confirm that all retaining rings are correctly mounted in the cable dropper.
8. The inspecting person replaces the tube holder cover and tightens the hand screws if the cover is not a snap fit.
9. The inspecting person then conducts a test run with the operating buttons on the control system (per Section 5.1.4).

5.1.4 Test run with Operating Buttons

Prior to transporting the unit, a test run is carried out using the operating switches on the control system. The display serves to indicate important information about the system.

1. Pull out the emergency stop master switch until the yellow marking is visible.
2. Press the test button until the hourglass on the display switches off again (5 seconds). The flashing warning triangle signals test operation.
3. Press the start button until the hourglass on the display turns off again (2 seconds).

4. The test run now proceeds automatically and lasts about 8 minutes, depending on the number of charges.
5. When the warning triangle switches off, the test run has been successfully concluded.
Do not switch off the control system or carry out another test run prior to transportation.
6. Once the system test is completed, close the deployment box, attach the padlocks, and prepare for transportation.

5.2 Transportation of the Deployment Box by Helicopter

The transportation of the deployment box by air is regulated by WorkSafe BC and the Transportation of Dangerous Goods Regulations. Personnel performing the tasks described below will meet the training and certification requirements list in Section 4.1 of the procedures.

The Wyssen deployment box is a small means of containment designed and secured to prevent the accidental release and detonation of the explosives during transport. Further safety measures are described in the procedures below to minimize risk to workers and the public.

The helicopter loading area and flight corridor will be at least 50 m from inhabited areas and publicly travelled roads. This area will be secured to prevent unauthorized access during the arming process. If the flight path requires that a publicly travelled road be crossed, specific procedures must be developed in accordance with WSBC OHSR Part 18 and the managing agency of the roadway.

5.2.1 Pre-planning for Helicopter Transportation

1. The pilot-in-command is provided with written information for each of the dangerous goods being transported, including:
 - a. The shipping name, UN number and class; and
 - b. The net explosive quantity (NEQ).
2. The pilot-in-command and ground crew review the operational procedures, operation of the load-carrying equipment, the flight plan, dangers when flying external loads and emergency procedures in addition to the standard pre-work tailboard (safety) meeting.
3. A long-line with an automatic electrical latch is used for transporting the deployment box. The helicopter company is responsible for ensuring good working condition of all load-bearing elements. The elements must be designed to carry loads of at least 700 kg.
4. No passengers are allowed in the helicopter during transportation of the deployment box.

5.2.2 Helicopter Attachment

1. In addition to the 50 m distance requirement, the staging area/receiving point of the loaded deployment box must be suitable for helicopter operations with appropriate approach and departure corridors.
2. Ensure weather conditions are suitable for helicopter operations.
3. The ground staff must wear an approved helmet or hardhat with chin strap, safety glasses, high visibility vest, gloves, suitable clothing and solid footwear.

4. No use of the Wyssen Avalanche Control Centre software is allowed during transportation of the deployment boxes. Use of the software is only permitted after the deployment box has been placed on the tower and the helicopter has left the danger area.
5. The Blaster of Record is responsible for a final check of each deployment box prior to transport to ensure the charge-dropping mechanism is on stand-by and the latch, padlocks and dropping hole are closed and secure.
6. During the approach to the receiving point, the pilot must establish contact with the ground staff as a communication check. If this attempt fails, the helicopter must land and the malfunction rectified prior to transportation.
7. The electric latch is connected directly to the transport hanger of the deployment box.
8. After attaching the deployment box to the helicopter, no persons are allowed to be under the suspended load.

5.2.3 Placement of the Deployment box on the Tower

1. The pilot brings the insertion funnel directly over the docking spike on the top of the tower, following the range of permitted approach angle in Figure 4.
2. As the deployment box is lowered onto the docking spike, the deployment box will automatically turn into the correct alignment. A flashing light on top of the deployment box blinks for 1 minute as soon as it is correctly positioned.
3. If during the positioning manoeuvre, the deployment box hits the tower heavily or is positioned roughly, the internal mechanism may be damaged and the pilot should not release the latch and must return the deployment box to the staging area for a test run.
4. Once the pilot confirms the deployment box sits firmly on the docking spike and is correctly positioned, the latch can then be released.
 - a. In the case the deployment box is released but not positioned correctly (i.e. no flashing light), the deployment box must be retrieved using the HK-02 latch and returned to the staging area.

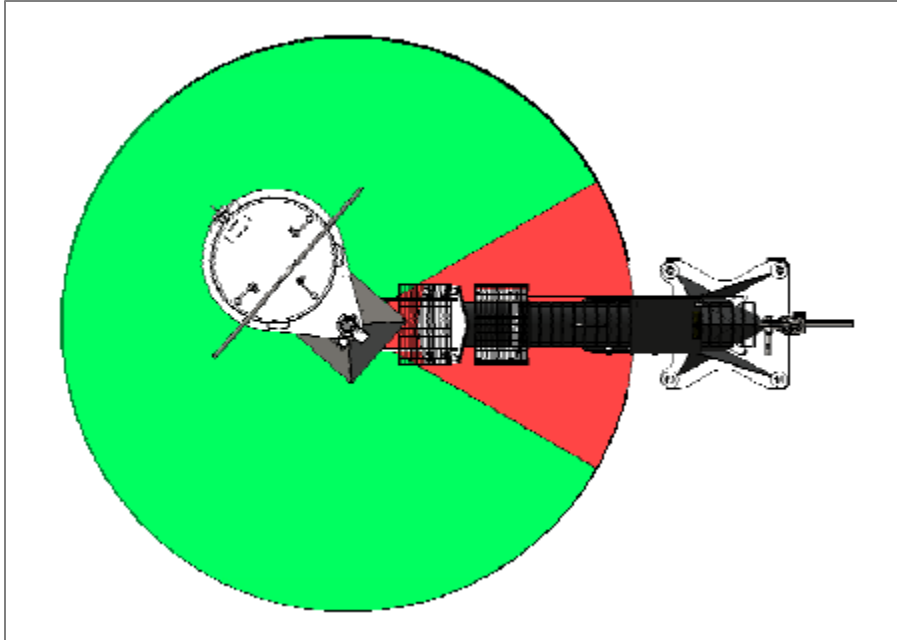


Figure 4. Range of permitted approach angle when placing the deployment box on the tower.

5.3 Live Testing and Operational Use

5.3.1 Area Closure

An area closure will be implemented as described in [refer to closure plan described in existing avalanche control procedures or add description here].

The general sequence of events from initiating the closure to re-opening the area following explosive control will be as follows:

1. Initiate the area closure.
2. Proceed to a safe firing location.
3. Ensure that the closure is effective and the danger area is clear.
4. Use the firing control system (Section 5.3.2) to control the selected WAT on the selected target.
5. Confirm detonation of the WAT using one or more of the following means: system detection by geophone, acoustically, or visually.
6. Misfire check.
7. Record the results.
8. Repeat steps 4 through 7 for the next target(s).
9. Notify closure control personnel that blasting has been completed.

5.3.2 Firing the System

The WAT are controlled using a web application (control.wyssenavalanche.com) to access the firing system. Individual login credentials and a code list are used in order to maintain a high standard of safety and security. The entry of login credentials and a single-use numeric code

from the code list is required prior to accessing the firing system. The firing system communicates with the towers via an encrypted radio communication system.

To fire the system:

1. Load the web application and enter your login credentials (internet access) or connect to the WAC.3 base (radio connection).
2. Enter the 8-digit numerical code.
3. The firing system is now activated until a charge is deployed, or until the time-out limit of 15 minutes is reached.
4. After deploying the charge, detonation must be confirmed. Detonation can be confirmed in three ways:
 - a. Automatic detection by the geophone and displayed in the firing system.
 - b. Acoustically.
 - c. Visually.
5. The firing system will display a 'closed and secure' status for the tower, indicating that dropping hole is sealed and the firing system connection is terminated.

5.3.3 System Malfunctions

If a fault occurs during the firing sequence, it is treated as a misfire and the misfire procedures in Section 5.3.4 are followed. The Wyssen Avalanche Control 24-hour support line should be contacted immediately.

5.3.4 Misfire Procedure

A misfire occurs when detonation cannot be confirmed by any of the three methods described in Section 5.3.2. Four types of misfires can occur (Type A1, A2, B1 and B2). Type A misfires are those which are hanging on the cord and Type B misfires are those which are lying in the snow. All types of misfires will be handled using the following procedures:

1. Maintain the area closure.
2. Observe the minimum waiting period of 30 minutes before approaching the danger, either by foot or in a helicopter.
3. Locate and visualize the misfire. This may require the use of a helicopter for towers that are difficult to access. Consider that misfires could potentially slide away from the tower and may have the potential to trigger an avalanche and be carried downslope to [highway/road/tracks] elevation.
4. Under no circumstances may a deployment box be transported beneath a helicopter with a suspended misfire.
5. If a cord is found in the area of a misfire, it must not be pulled since this can activate the percussion fuse lighter and detonate the charge.
6. A misfire must not be moved.
7. For both Type A and B misfires, confirm the wire hooks are evident on the cord, which confirms the percussion fuse lighter was activated. If the wire hooks are not evident (i.e. still attached to the percussion fuse lighter), the percussion fuse lighter may not have been activated and extra caution is required.

8. For Type A misfires, remotely release the charge retaining cord from the deployment box.
9. Once the misfire is on the snow surface (Type B) or already on the surface (Type B), deploy a conventional explosive to detonate or destroy the misfire, as per the helicopter control or hand charging misfire procedure described in [refer to misfire procedure described in existing avalanche control procedures or add specific procedure within this plan]. The additional explosive can be deployed either by helicopter, or if the misfire can be safely accessed on foot, by hand.
10. Confirm the detonation and perform a post-blast inspection to confirm the misfire was destroyed.

5.4 Post-Season Decommissioning

During the summer, it is preferable to house to the deployment boxes in secure, dry storage. Explosive charges that have not been used are preferably detonated prior to deployment box removal, but if this is not possible (e.g. malfunction of the deployment box), the charges must be removed from the deployment box. The charges can then be disassembled.

5.4.1 Return Transportation of the Deployment box by Helicopter

The Wyssen helicopter latch is attached to the automatic electrical latch on the long line to retrieve the deployment box.

The Wyssen helicopter latch must be regularly inspected and tested for proper functioning and damage prior to each transport of the deployment box as follows:

- The latch must be free to move upwards as far as the stop;
- The latch must drop and close independently through its own weight;
- In the closed state, the notch of the latch must lie on top of the supporting bolt;
- No cracks shall be visible on the latch or handle; and
- The latch and the handle must not be deformed.

If any defects are found or if there are any uncertainties, the helicopter latch in question must not be used.

The Wyssen helicopter latch is used for the return transport of the deployment box only. This allows the attachment of the deployment box to the helicopter longline without the assistance of ground personnel. Under no circumstance may the latch be used for the lifting of other loads. During the lifting of the deployment box, no personnel are permitted to be on or near the tower.

The following procedure is used to retrieve the deployment box from the tower.

1. The pilot then flies over the deployment box and lowers the Wyssen helicopter latch over the fork of the transport hanger on the deployment box. Once lowered far enough, the latch on the Wyssen helicopter hanger will catch the transport hanger and secure the deployment box to the helicopter longline.

2. As the pilot lifts the deployment box off the tower, they must ensure that they are lifting vertically to ensure that they do not cause damage to the tower.
3. As soon as the deployment box is lifted off the tower, the monitoring switch automatically deactivates the power supply in order to prevent an accidental release of a charge, should any charges remain in the deployment box.
4. The deployment box is transported to the staging area and set down carefully.
5. The deployment box must be resting on the ground and the helicopter longline not under tension prior to uncoupling. The latch must only be opened by the black lever on the Wyssen helicopter hanger by ground staff.
6. Once the deployment box is released, the pilot is signalled so they can depart.

5.4.2 Unloading Explosive Charges from the Deployment box

If the deployment box is returned to the staging area with explosive charges still inside, the following steps are followed when unloading:

1. Open all padlocks on the cover and turn the locking level through 90°.
2. Lift the cover using handles provided until the safety catch engages.
3. Press the emergency stop master switch to ensure the system is deactivated and to protect the batteries during summer storage.
4. Activate all sliders on the cable dropper by pressing the side of the ball bearings toward the back.
5. Ensure the retaining ring is disengaged from the cable dropper.
6. Remove the cable dropper from the tube holder.
7. Take hold of the charge through the holes at the top of the plastic shell and lift out of the tube holder.
8. The primed charge is placed and secured in the temporary storage rack until the blaster is prepared to destroy or disassemble the charge.
9. Close the deployment box.

5.4.3 Charge Disassembly

1. Charges may only be disassembled if authorized by the manufacturer.
2. Loosen the screw sleeves at the bottom of the percussion fuse lighter by one turn.
3. Remove both safety fuse assemblies from the percussion fuse lighter through the openings on the side of the plastic shell.
4. With a slow, smooth and even pressure, remove both safety fuse assemblies from the charges. If resistance is encountered, the charge should not be disabled and must be destroyed in an appropriate safe location using the misfire procedure.
5. The safety fuse assemblies may not be stored or transported because they are shorter than the 1 m minimum for length required by WSBC OHS Regulation 21.56(2). The safety fuse assemblies must be destroyed in an appropriate safe location **using the misfire procedure**.
6. Re-open charge containers to remove the explosive cartridges. Explosive cartridges must be re-packaged in appropriate certified and labeled boxes for transportation and storage. Expiration dates should be noted and must not be exceeded during subsequent

use. If it becomes necessary to dispose of any explosive products, the disposal of these explosive products must be conducted in accordance with the manufacturers' recommendations using procedures as outlined in the WorkSafeBC Blasters' Handbook.

7. Plugs must be re-inserted into the percussion fuse ignitors to protect them from moisture contamination.

5.4.4 Preparing the Deployment box for Storage

In order to ensure that the battery survives the summer without any damage, it should be completely charged prior to being placed in storage. Connect the battery to the charger for at least 24 hours. The battery must only be charged with a designated battery charger which has temperature-controlled charging voltage. Battery chargers such as those used for car batteries are not suitable and damage the battery.

5.5 Emergency Procedure - Accidental Ignition

In the unlikely event of an accidental ignition of a charge during charge construction or loading of the deployment box the following steps will be followed:

1. The person recognizing the accidental ignition will call "Ignition, ignition, ignition!" in a loud voice ensuring that everyone heard it.
2. The person handling the charge will take the charge container to a designated location and retreat quickly. The location for the deposit of the charge depends on the site characteristics. The location will be pre-determined, preferably in a pit behind a concrete barrier.
3. Everyone will move in the opposite direction, at least 50 m away and out of line of sight from the deposited charge or move into a protective shelter, e.g. a sea can, a building or a large vehicle.
4. Wait and confirm audible detonation of the charge.
5. Observe the minimum waiting period of 30 minutes or the manufacturer's recommendation whichever is longer before approaching the charge in case an audible detonation could not be confirmed. Follow the misfire procedure if the charge did not detonate.
6. Cease assembly operation and review the incident.

5.6 Emergency Procedure - Dropped Deployment box

In the unlikely event the deployment box is dropped during helicopter transport, it will be known to the Blaster of Record whether or not the deployment box contains explosives. If it does not, then a plan can be put in place to safely recover the deployment box. If the deployment box does contain explosives, the following procedure is followed by the Blaster of Record:

1. **Dial 911** to activate required emergency services (police, fire and/or ambulance).
2. Begin evacuation of the area around the deployment box to a distance of 1600 m in all directions.
3. Contact the following:

- a. Local RCMP Detachment (detachment listings can be found here: <http://www.rcmp-grc.gc.ca/detach/index-eng.htm>);
 - b. Provincial Emergency Program (PEP) **1-800-663-3456** (24 hours)
 - c. Provincial Transportation Management Centre **1-866-706-7862** (24 hours)
 - d. Explosive technical advisors as necessary
 - e. Wyssen Avalanche Control Inc. (Switzerland) **+41 79 628 10 83**
 - f. Notify Explosives Regulatory Division – Pacific Region **604-666-0366**¹.
 - g. Notify WorkSafe BC **1-888-621-7233**.
4. Assist the Emergency Response Personnel (Incident Commander and/or Accident Site Commander) in the role of Technical Advisor in order to safely and efficiently recover and dispose of explosive products.
- a. Assess explosive division type(s), quantity and conditions at the accident site to determine minimum evacuation distance.
 - b. Arrange for the delivery of explosives clean up materials and equipment as necessary for the severity and extent of spilled explosives.
 - c. Confirm with Incident Commander and/or Accident Site Commander that assistance from outside agencies (e.g. RCMP, PEP and CANUTEC) has been requested and dispatched as necessary. Ensure that essential personnel only are involved in the transfer and clean-up of spilled explosive products in order to minimize risk.
 - d. In consultation with external expertise (e.g. Wyssen, WorkSafe BC), advise the Incident Commander and/or Accident Site Commander of the most appropriate actions to ensure safety of all personnel involved.
 - e. Liaise closely with the Incident Commander and/or Accident Site Commander and outside agencies at the accident site (e.g. RCMP) to ensure that all decisions made reflect the utmost concern for safety of involved personnel.
 - f. Ensure that the area has been thoroughly searched to confirm that all spilled explosive materials have been removed prior to re-opening the evacuated area.

¹ Use form F07-01 for reporting incidents to the Explosive Regulatory Division.

6.0 Closure

These procedures have been developed for use by [company name] with the Wyssen Avalanche Tower (WAT).

They describe blasting equipment used with the WAT, personnel training, the assembly and loading of explosives in the tower deployment box, flight operations for the helicopter transport of the tower deployment box, deployment of the explosives using the remote system and misfires. Procedures are in accordance with WorkSafe BC (WSBC) Occupational Health and Safety Regulations (OHSR) Part 21 – Blasting Operations and Part 29 - Aerial Operations, Natural Resources Canada Explosive Regulations, Transportation of Dangerous Goods Regulations Part 12.12 – Aerial Work and the Wyssen Avalanche Tower LS12-5 G3 Instruction Manual (v 3.8, July 2017).

These procedures will be reviewed annually and if any changes are made, they must be approved in writing by WorkSafe BC.