

ACT Safety Rules in Brief

Version 1.2.5

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Read the ACT Site Safety Manual in full. This document, which comprises excerpts from the Safety Manual, is only a quick reference.

1 ACT Brief Safety Policies for Transit

- There must always be at least two people in the truck and at the site¹.
- A truck approved for use must be equipped with a roll-over protection bar. Everyone in the truck must wear a seatbelt. Don't use the phone while driving. Alcohol use is prohibited.
- In the truck must be: charged ALMA radio, charged GPS tracker, charged satellite phone, snow chains, shovels, water and cold weather clothes for everyone in the truck, bottled oxygen, first aid kit, fire extinguisher, spare tire, windshield scraper, ropes or tow strap.
- It is highly recommended to also carry a spare set of insulated work coveralls, spare work gloves, a spare hat and at least four heavy-duty space blankets, an emergency light, a supply of high-protein snacks (like energy bars) and at least two spare snow chains in the truck as well. It is also recommended to use a truck equipped with a tow hook on its back bumper.
- Always use the transit alarm button on/off. This web-based button notifies the remote observer when you are leaving from / returning to San Pedro de Atacama, and then when you have arrived at the destination. An alarm is emailed if the trip is longer than 2.6 hours.

¹In exceptional circumstances (such as when the presence of colleagues on the Parque Astronómico Atacama concession has been confirmed, and/or when colleagues in North America are in close and frequent Slack contact), experienced ACT personnel who are approved drivers may be allowed to drive to and from the site alone during daytime hours. Confirm with Staggs, Devlin, or Fankhanel before doing so.

- Do not pass unsafely on the Paso de Jama or en route to Calama. Never pass on the curved sections of the Paso de Jama. Look out for broken-down trucks or animals on the road.
- Obey posted speed limits. Do not exceed 60 km/hr on any dirt road. On the CONICYT road, do not exceed 50 km/hr and always use your headlights. In general, drive for the conditions as you find them: more slowly around the curves (30 km/hr or down to 10 km/hr on steep curves), more slowly when the road is rough or icy, etc.
- Do not encourage drivers to drive faster than they are comfortable with. If driving in a caravan, make sure the slower driver goes first.
- Do not drive if exhausted or feeling unwell. Keep in mind that mental functioning is impaired at high altitude.
- Be particularly careful to watch your speed when descending. Downshift to use the engine for braking and keep the brakes cool. Nearly all ALMA accidents have occurred during descent. If driving in the dark after having been at the site for more than three hours, it may be beneficial to use oxygen.
- If there is a truck accident, contact ALMA immediately on Channel 1 on the radio (Channel 3 for backup). Stay with the truck until help arrives. In case of emergency, assess the situation, administer basic first aid as necessary, call ALMA, then contact Miguel Angel Díaz in San Pedro de Atacama, and finally, contact Staggs, Devlin, Page (or the ROC if the others are unreachable) in North America. As a last resort, if you cannot contact ALMA on the radio, and the satellite phone is not working, use the “Help” button on the SPOT tracker. (Do not use the SOS button.)
- In the case of other problems with the vehicle, such as flat tires, overheating, or other issues, assess the situation. If the weather conditions are good, and you feel confident to do so, attempt to repair the problem. If you cannot repair the problem, and the weather conditions are good, contact Miguel Angel Díaz and/or colleagues from ACT, CLASS or POLARBEAR to arrange to be picked up. If the environmental conditions are not good, contact ALMA on Channel 1 on the radio (Channel 3 for backup). Stay with the truck until help arrives. (As a last resort, if you cannot contact ALMA on the radio, and the satellite phone is not working, use the “Help” button on the SPOT tracker; do not use the SOS button.)
- Do not go up to the site if the ALMA road to the AOS is closed due to bad weather at the high site. Check for email to the CWG mailing list about road closings before every ascent. Call the ALMA safety office (see Table 4) if you are unsure.

- When there is more than 5 cm of snow on the mountain road, follow the ACT Snow Guidelines described in Section 2.
- If you are stuck in the snow in one place for more than 30-60 minutes without another reliable source of assistance,² contact ALMA safety on Channel 1 on the radio.
- No one may ride in the open bed of a truck; that area is for cargo only.
- Do not pick up hitchhikers. Assist anyone in need without putting yourself into danger. For example, call for assistance.
- Take extra care when dark. When dark, do not use the km 45 exit to the Pampa la Bola road. Use the CONICYT road or the ALMA road.

2 ACT Snow Guidelines

Do not attempt to ascend to the site with less than half a tank of diesel in the truck if there is snow ≥ 5 cm deep on the road.

- Caution is strongly advised under the following circumstances with snow ≥ 5 cm deep on the road. If two or more of the following apply, **do not attempt to ascend to the site.**
 1. When driving with little prior experience in snow and/or off roading, or if unsure/anxious.
 2. When driving with a single truck.
 3. When driving a truck without snow chains and/or mud terrain (MT) tires.
 4. When riding in a convoy (2 or more trucks) in which one is without a complete set of proper equipment (hooks/shackles, tow straps, shovels, snow chains).
 5. When starting the ascent in snow later than 2pm.
 6. When starting the ascent in the face of forecasts of bad weather (snow or high winds) or actual bad weather conditions.
- If any of the following conditions holds, **abort the attempt to ascend to the site.**
 1. If snow is not packed down and is deeper than: 15 cm for a truck without MT tires and/or chains, or 30 cm for a truck with MT tires and/or chains.
 2. If strong winds are present (≥ 45 km/hr).
 3. If patches of snow are deeper than 50 cm and longer than 2 m.

²For example, another reliable source of assistance might be another truck with whom you are in contact, within easy walking distance lower down the road, which is not stuck in the snow.

4. If visibility drops below: ~ 30 m before 2 PM, or below ~ 50 m after 2 PM.
 5. If you lose a chain more than once, or if a chain fails (links, locks, shackles, etc. get damaged).
 6. If you are in a single truck and get stuck more than once in the same spot/area, or more than 3 times on the whole route.
 7. If you are in a convoy and one truck gets stuck more than once in the same spot, or if the other vehicles get stuck as well, or if the convoy has to halt in one spot for more than 20 minutes.
 8. If weather conditions suddenly worsen and linger for more than 20 min (quick drops of temperature and/or visibility, strong gusts of wind, snowing/hailing, etc.)
 9. If the snow is blowing and/or falling sufficiently to cover up the tracks of the truck in 15 minutes or less.
- You should also check in with the rest of the team and/or convoy if you get stuck or lose a chain even once, and consider aborting the attempt to ascend at that point if it is late, or team members are too cold or tired. Safety is more important than accessing the site.

3 At the Site

- No one should be left alone on the mountain³. If you are working in a space apart from other team members for some task, aim to check in with the others every hour.
- Except in case of emergency, do not spend the night at the site.
- Use supplemental oxygen as needed. Use sunscreen during the day.
- Know the wifi passwords and container lock combos for the other projects at the Toco site in case of emergency. Know where to find emergency contact information.
- Know how to use the telescope emergency stops (estops). Always use an estop when working on the telescope. Take responsibility for confirming yourself that an estop is engaged before accessing the telescope, and if you were to notice a colleague forgot to use one, you should engage an estop and let the colleague know.
- Take your university's lab safety training before coming to the site. Be familiar with and follow all the usual lab safety requirements.

³In exceptional circumstances (such as when the presence of colleagues on the Parque Astronómico Atacama concession has been confirmed, and/or when colleagues in North America are in close and frequent Slack contact), experienced ACT personnel may spend a limited amount of time alone on the site. Confirm with Staggs, Devlin, or Fankhanel before doing so.

- Don't use equipment you haven't been trained on. For example, read about extension ladders before using them (<https://www.osha.gov/Publications/OSHA3660.pdf>) and ask a senior colleague if you have questions.
- The site must be maintained with supplemental oxygen, first aid kit, fire extinguisher, water and food supplies. Contact information must be posted, and this manual must be available at the site. It is highly recommended to have a spare drum of potable water on site for use on injuries, and a working AED. Everyone working at the site should know where to find these items and should know who at the site is CPR and first aid qualified.
- Pay attention to the weather. Check for ALMA emails to the CWG every few hours. Descend if it gets bad (more snow than a snow shower, decreasing visibility).
- Do not feed any wildlife.
- Harming any cultural heritage (including archaeological ruins) is forbidden, as is hunting or disturbing native animals. Any environmental damage or accident must be reported verbally to Staggs or Devlin within 24 hours for reporting to CONICYT.

4 Contact information

Table 4 below provides critical contact information. The column labeled “from non-Chile line” shows how to call from a US (or other non-Chilean) cell phone or from Skype. The column labeled “from Chile mobile” shows how to call from a Chilean cell phone.

Emergency Contact Information			
Primary method of reporting emergencies: ALMA radio channel 1			
Contact	from non-Chile line	from Chile mobile	Comments
Reporting Emergencies to ALMA	+56 2 2467 6555	2 2467 6555	(radio contact preferred)
ALMA OSF First Aid Station	+56 2 2467 6400	2 2467 6400	
ALMA AOS First Aid Station	+56 2 2467 6532	2 2467 6532	(high site)
ALMA Safety Manager	+56 9 7559 4755	9 7559 4755	(cell phone)
ALMA Deputy Safety Manager	+56 9 4234 8247	9 4234 8247	(cell phone)
SPdA Health Clinic	+56 55 285 1010	55 285 1010	(24 hr)
SPdA Police Station	+56 55 275 5350	55 275 5350	(Spanish required)
Miguel Angel Díaz	+56 9 4228 4382	9 4228 4382	(cell phone)
Max Ernesto Fankhanel Parraguez	+56 9 6832 6576	9 6832 6576	(cell phone)
Diego David Maldonado Espindola	+56 9 9689 3317	9 9689 3317	(cell phone)
Rodrigo Guillermo Freundt Rueda	+56 9 3884 8825	+56 9 3884 8825	(cell phone)
Rolando Dünner	+56 9 824 98194	9 8249 8194	(cell phone)
Suzanne Staggs	+1 609 468 3086	+1 609 468 3086	(US cell phone)
Mark Devlin	+1 267 243 9865	+1 267 243 9865	(US cell phone)
Lyman Page	+1 609 216 3172	+1 609 216 3172	(US cell phone)
Angela Lewis	+1 609 258 0720	+1 609 258 0720	(US landline)
Deniz Augusto (CLASS)	+56 9 4401 6424	9 4401 6424	(cell phone)
Julianna Couto (CLASS)	+1 202 460 3308	+1 202 460 3308	(US cell phone)
José Cortés (POLARBEAR)	+56 9 8149 0241	9 8149 0241	(cell phone)
Nolberto Oyarce (POLARBEAR)	+56 9 9218 8202	9 9218 8202	(cell phone)

More emergency contacts may be found on p. 22 of the ALMA Safety Manual, https://wikis.alma.c1/twiki/pub/ALMASafety/SafetyTopDocuments/Alma_2012_accepted_signed_Manual.pdf. Note that a number of satellite phone numbers are listed there, but ALMA has informed us those phones are not usually turned on; they are for calling **out** in emergencies. Thus you might be contacted via a satellite phone number like 00 8816 224 12017 (or 12016 or 27616 for the last block of digits).