



# NATA Safety 1st® eToolkit

Welcome to the third issue of the NATA Safety 1st® eToolkit, our monthly online safety newsletter, for the NATA Safety 1st® Management System (SMS) Initiative.

This monthly newsletter will highlight known and emerging trends, environmental and geographical matters as well as advances in operational efficiency and safety. Flight and ground safety has been enhanced and many accidents prevented because of shared experiences.



The NATA Safety 1st® Management System Initiative is in the final stages of development. Many of the tools discussed in this and other eToolkits will be provided as a part of the program. Look for more information in next month's eToolkit

## SAFETY CASE STUDY: AIRCRAFT TOWING AND PARKING



In the previous Safety 1st® eToolkits, we addressed *Vehicles on the Ramp* and briefed the core components of a vehicle control plan. On this foundation, we provided a more detailed *Vehicle Safety Program*. Building off of these two modules, we now offer a detailed overview of the safe movement of aircraft under tow. In next months eToolkit, we will address hangar stacking and the tools of the Professional Ramp – Wands, Whistles, Cones and Chocks.

### Aircraft Towing and Parking

Today's active apron includes the usual movement of aircraft, GSE, fueling vehicles and support vehicles. What has changed over time is the size and handling characteristics of the aircraft you can see on any given day. The ground ops portion has remained the same with some slight changes – We still marshall in aircraft, hopefully use day and/or night wands, chock aircraft, position GSE to support the crew's needs and reverse it when the aircraft departs. Over the past ten years, safety cones have become more prevalent but their use is inconsistent from facility to facility. We'll address that one next month. For this month's eToolkit, we will

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discuss basic towing and parking safety procedures for the vast majority of aircraft found on today's aprons.

✈ **Aircraft** – Every airframe manufacture provides detailed towing and handling instructions in their AOM. For instance today's large format corporate aircraft all require a brake rider during towing operations. For extended distance towing, a properly trained brake rider (or better yet, one of the crew members) should be positioned in the cockpit, with appropriate systems energized and in radio contact with the ground crew. Voice Activated Radios are recommended. Where there is a conflict with the aircraft manufacturer's towing instructions, the manufacturer's instructions shall be followed.



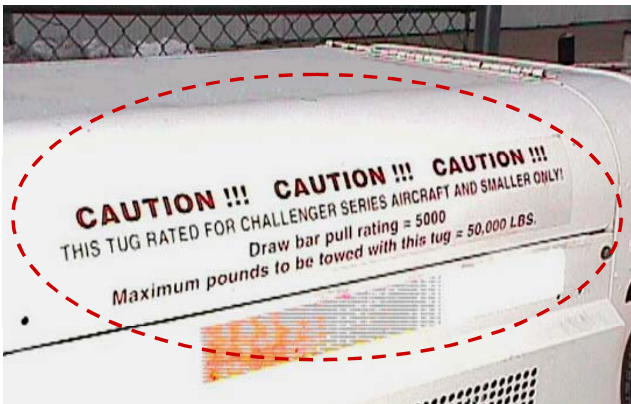


## SAFETY CASE STUDY: AIRCRAFT TOWING AND PARKING



→ **Ground Support Equipment** – The importance of suitable, properly maintained GSE is essential to the safe movement of aircraft. There are some essentials when it comes to towing aircraft such as: Draw Bar Pull Ratings; Tow Hitches, and Brakes.

- Draw Bar Pull<sup>1</sup> – From our good friends at SAE Technical Standards Board, “Drawbar Pull Available (DBPa) is the net force, in pounds that the tractor is capable of producing at the tow coupler device. It is the tractive effort, (TE), minus the force required to move the tractor on the driving surface.” More simply, it is the ability of the tow tractor to safely control the weight of the aircraft over various surfaces/grades and in various weather conditions.



- **Tow Hitches** - Tow hitches or coupler devices must be bolted to the frame and constructed out of materials designed for use in heavy stress situations. Grade 8 bolts shall be used at all times to secure tow couplers to the frame. Anytime a modification is made to a tow tractors hitch/coupler, you may be changing the acceptable towing characteristics of the vehicle. Check with the OEM or have an engineer evaluate your intended modification for the type of use you are thinking about.
- **Brakes** - The braking capability of a tow tractor should be designed for the safe, controlled, deceleration to a full stop of the entire train (tractor and towed load). From the point of view of actual brake performance, Federal and SAE Standards and

various airport regulations offer some criteria for performance. The parameters involve test speed, minimum deceleration rate and/or maximum stopping distance.

→ **Trained Personnel and Wing Walkers** – We’ve discussed the importance of properly trained and ‘aware’ individuals on the ramp – remember, on any given day, one false move and that \$40M Chariot is down and out. NATA Safety 1st<sup>®</sup> provides guidance in Module 6 on towing and wing walking. Using this guidance, we will provide enhanced techniques to ensure you are controlling the inherent risk of the ramp while aircraft are taxiing or being towed.

→ Generally wing walkers should be used anytime an aircraft is to be taxied or towed within 25 feet of an obstruction.

- Don’t think you have enough wing walkers? Talk to your Trainer about including your Customer Service Personnel, if not already used, in the Ramp Safety Program. Getting the Front Counter staff trained and involved will provide the depth you need on the ramp to handle those days when you are thrown a curve ball.

→ **Marshalling Signals** – Strict adherence must be paid to accurate marshalling signals. The internationally accepted ICAO standard shall be used. But for a dose of reality, remember that most of the pilots flying corporate equipment today are not military trained, where marshalling signals are the chief means to provide critical communication to the pilots and the safe operation of the aircraft. A marshaller using military precise hand signals is a work of art and a sign of true respect. Give Respect and Get Respect.

- **Remember** – Safety First
  - Be Precise in your movements
  - Maintain a Professional Timed Cadence
  - Use Day or Illuminated Night Wands
  - Be where you are expected to be
  - If any doubt (did I say ANY doubt) STOP!
  - Maintain Communication with your Team

- **The Whistle Works!**

<sup>1</sup> SAE AIR-1316



## SAFETY CASE STUDY: AIRCRAFT TOWING AND PARKING



### Aircraft Towing

- ✈ **Qualified Personnel** – The safe towing of any aircraft in a congested area will require as many as four people. Be realistic - if you have an active ramp, utilize your skilled personnel for the more complex tasks, such as towing and stacking. Enlist other trained and qualified employees to assist with marshalling duties.
- ✈ **Towing Supervisor/ Vehicle Operator** – The towing supervisor is in complete command of the towing operation and must be qualified for the vehicle. The supervisor has a checklist covering all towing procedures and is in a position, usually at the aircraft nose, to see the towing team members at the wingtips and tail. For large corporate aircraft it is desirable for the towing supervisor to be in direct radio contact with the wing walkers and the brakeman in the cockpit.
- ✈ **Wing and Tail Walkers** – These individuals shall be positioned off of the wingtips and tail by approximately ten feet and are responsible for the vertical and horizontal clearance of the wings and tail from any obstructions. All wing walkers will be in visual contact with the tow vehicle operator. Clearances may become critical when hangaring an aircraft, so wing-walkers must stop the move well before the aircraft surface comes into the ‘RED



**Mini Case Study:** A recent hangaring accident resulted when the wingwalker failed to blow a company issued whistle before the wing tip entered the red zone. Upon investigation, it was determined that the wingwalker neglected to have the whistle in his mouth from the start. The time it took to remove the whistle from his pocket and then blow it allowed enough time for the wingtip to strike the fire suppression system riser. This particular company did not specify when the whistle should be sounded. In this case, the wingtip was critically close to the riser when the employee finally sounded the whistle to STOP. The Company has now specified that in accordance with its two-foot rule between aircraft or structure, the whistle will be sounded anytime any portion of the aircraft approaches the two foot distance between obstructions.

ZONE” or the point of diminished return. The RED ZONE is described as the distance between two objects and is generally accepted to be two feet or ‘arms length’.

- ✈ **Brakeman in Cockpit** – For all large corporate aircraft there should be a brakeman in the pilots seat position in a manner that allows actuation of the aircraft brakes. The brakeman should be a qualified flight crewmember assigned to the aircraft. The brakeman shall be in direct radio contact with the towing supervisor and be able to clearly see any hand signals the towing supervisor may provide in the event of loss of radio contact. The brakeman should alert the towing supervisor anytime hydraulic pressure drops below safe operating limits.
- ✈ **Chocks** – The tow team shall always have a set of large rubber chocks available. The chocks shall be used on the main landing gear when parked (all three landing gear if parked overnight). In addition, warning cones shall be placed at the four corners of the aircraft.
- ✈ **Radio Contact** – If the tow is to use the taxiways (movement areas), radio contact shall be





# SAFETY CASE STUDY: AIRCRAFT TOWING AND PARKING



maintained with ground control. Both the towing supervisor and the brakeman in the cockpit shall maintain contact with ground control.

- ✈ **Towing Speeds** – 5 MPH maximum.
- ✈ **Towing Signals** – Ideally, for transport category tow movements, all tow team members should be in radio contact. Visual hand signals have not proved to be entirely effective when there is a significant distance between wingwalkers and the tow operator. In the event radio contact cannot be maintained, whistles shall be provided as an effective and proven means to provide audible signals on a noisy ramp. Tow team members shall place the whistle in their mouth to allow for the immediate use if necessary (See whistle use during aircraft and vehicle movements at [http://www.nata.aero/safety1st/eline/eline\\_issue17.html](http://www.nata.aero/safety1st/eline/eline_issue17.html)).
- ✈ **Towing Preparation** – Tow team members shall conduct a walk around of the aircraft to determine any pre-existing damage prior to initiating towing operations. In addition, congested towing areas shall be surveyed for safe operations prior to initiating towing operations. If a brakeman is used, a briefing shall be conducted by the towing supervisor to coordinate efforts during towing operations.

✈ **Wing Growth** – This is no myth. Did you know that during aircraft ground movements wing clearance is not always constant? If you plan to tow, taxi, or marshal aircraft in close quarters you must be aware of the condition known as “wing growth”. “Wing growth” has to do with the initial static (at rest) wing tip clearance between the vast majority of swept wing aircraft wing tips and say – a hangar wall, and the fact that when the aircraft is pivoted on its main wheels, the wing tip and horizontal stabilizer clearance may decrease as the wing tip/tail surface arc or track moves outward. This condition is depicted in figures 1 and 2. When

feasible, always use the largest turn radius possible and remember the wingtips and the horizontal stabilizer move in larger arcs than the aircraft’s nose, so monitor these areas of the aircraft carefully for clearance with structures, equipment, and other airplanes.

- ✈ **Parking** – Aircraft shall be parked in a manner that reduces hazards such as exposure from other aircraft (i.e. jet blast, etc.). Both main landing gear should be chocked with large rubber chocks. Aircraft remaining parked overnight shall be triple chocked. In addition, warning cones shall be placed at the four corners of the aircraft.

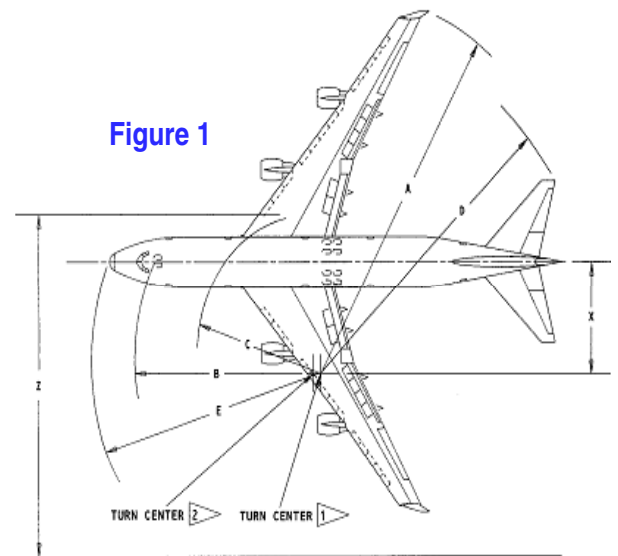


Figure 1

**Figure 2**

| X<br>TURN<br>RADIUS<br>(FEET) | CLEARANCE RADIUS - (FEET) |     |                |     |                |     |               |     |           |     | Z<br>MINIMUM WIDTH<br>FOR 180°<br>TURN (FEET) |     |
|-------------------------------|---------------------------|-----|----------------|-----|----------------|-----|---------------|-----|-----------|-----|---|-----|
|                               | A<br>WING TIP             |     | B<br>NOSE GEAR |     | C<br>WING GEAR |     | D<br>TAIL TIP |     | E<br>NOSE |     |   |     |
|                               | 1                         | 2   | 1              | 2   | 1              | 2   | 1             | 2   | 1         | 2   | 1   | 2   |
| 40                            | 157                       | 159 | 96             | 91  | 61             | 61  | 142           | 146 | 117       | 112 | 156   | 152 |
| 60                            | 176                       | 177 | 106            | 102 | 81             | 81  | 154           | 158 | 125       | 120 | 187   | 183 |
| 80                            | 195                       | 196 | 119            | 115 | 101            | 101 | 167           | 171 | 136       | 132 | 219   | 216 |
| 100                           | 214                       | 215 | 133            | 130 | 121            | 121 | 182           | 185 | 148       | 145 | 254   | 251 |
| 120                           | 233                       | 234 | 149            | 146 | 141            | 141 | 197           | 200 | 162       | 159 | 290   | 287 |
| 140                           | 253                       | 254 | 166            | 163 | 161            | 161 | 213           | 216 | 178       | 175 | 327   | 324 |
| 160                           | 272                       | 273 | 183            | 181 | 181            | 181 | 230           | 233 | 194       | 191 | 364   | 362 |



## SAFETY CASE STUDY: AIRCRAFT TOWING AND PARKING



### Hangar Stacking

Trained guidemen or wingwalkers should be used anytime an aircraft or for that matter a vehicle/crate or whatever may cause metal to bend, will be moved into close proximity to any other aircraft, structure or vehicle.

Nothing pains an aircraft owner/operator more than arriving on the active, congested ramp when the line personnel are not visible to properly designate a parking spot and assist in the safe ground operation of the aircraft. Remember – its your Ramp – Manage it. Make good use of your Unicom so it becomes a routine part of your operation's service program. If your Customer Service Personnel are not directly a part of your ramp safety/service program, train them and get them in the game. The more eyes watching your ramp, or your SERVICE STAGE, the better – for SAFETY, for SECURITY and for SERVICE.

*In Next Months Safety 1st eToolkit* – We will present two Feature Articles: Hangar Stacking and The Professional Ramp: Cones, Chocks, Whistles and Wands.

### SAFETY ALERT:

## HIGH WINDS PLAN

Unfortunately the hurricane season is not over yet. We hope the remainder of the season passes without any further devastation. The good news is you can prepare and follow safety procedures for inclement weather. Below is a plan that Delta Global Services uses to deal with high winds. We thought the information was applicable to many aviation facilities. Please note our **safety alert card** is a smaller checklist of procedures that you can adapt to your facility needs. Make sure to post it so that appropriate personnel can use it to assure the safety of your operation.

## HIGH WINDS PLAN

*By Tom Hatten Delta Global Services*

Local Station Supervision/Management must stay alert to available sources that predict possible severe weather and keep ramp advised. Additionally, all personnel must be alert to the conditions around them, and take action or seek advice if the situation is perceived as potentially dangerous.

Information sources include, but are not limited to:

- ✈ Local or cable TV weather forecasts, alerts and warnings.
- ✈ Local radio weather forecasts, alerts and warnings.
- ✈ National Weather Service forecasts, alerts and warnings.
- ✈ FAA Tower
- ✈ Pilot reports
- ✈ Personal observations
- ✈ Local airport authority
- ✈ Other airlines
- ✈ Internet weather sources



## SAFETY ALERT: HIGH WINDS PLAN



### SAFETY PROCEDURES

If high winds or thunderstorms are in the immediate area (1-5 miles) the following precautions should be made as applicable:

- ✈ Stop all fueling operations
- ✈ Stop all headset communications
- ✈ Use telephone only in emergency
- ✈ Close all aircraft cargo and service doors (passenger doors may remain open if they are being accessed by a loading bridge)
- ✈ Stop the loading /unloading of passengers unless a loading bridge (jetway) is being used.
- ✈ Evacuate the ramp area (Do not seek cover under any part of aircraft).
- ✈ Notify other departments and/or business partners that may be affected.

If you cannot seek shelter inside a building:

- ✈ If in a remote area, seek cover inside an aircraft or inside a metal bodied vehicle. **DO NOT SEEK COVER UNDER ANY PART OF AN AIRCRAFT OR OPEN VEHICLE/TUG.**
- ✈ Stay away from open water, outdoor equipment and small metal vehicles.
- ✈ Avoid open areas.

- ✈ Stay away from wire fences, metal pipes and railings.
- ✈ If you are hopelessly isolated and feel your hair stand on end (an indication that lightning may be about to strike) drop to your knees and bend forward, putting your hands on your knees. **DO NOT LIE FLAT ON THE GROUND.**
- ✈ Stay calm and alert

### EQUIPMENT

- ✈ When possible, move equipment inside (bagroom, maintenance bay, paint booth, cargo area, etc.) starting with the lightest equipment to the heaviest.
- ✈ Double chock all equipment possible.
- ✈ Circle carts and leave curtains open.
- ✈ Bring cones, wands, and any small items inside.
- ✈ Pull all equipment as far as possible from aircraft (especially GPU's).
- ✈ Tie down or tape GPU cord on jetway to keep from striking aircraft.
- ✈ Lower all stair units to lowest possible setting.
- ✈ Look at ramp and use common sense. Ask yourself what can be blown away.

**Never Put Yourself In Danger. If High Winds Or Severe Thunderstorms Already Exist, Seek Shelter Immediately.**

## SAFETY ALERT CARD

### High Winds Plan

#### Safety Procedures: High Winds / Thunderstorm Precautions:

- ✓ Stop all fueling operations
- ✓ Stop all headset communications
- ✓ Use telephone only in emergency
- ✓ Close all aircraft cargo and service doors (passenger doors may remain open if they are being accessed by a loading bridge)
- ✓ Stop the loading / unloading of passengers unless a loading bridge (jetway) is being used
- ✓ Evacuate the ramp area (Do not seek cover under any part of aircraft)
- ✓ Notify other departments and/or business partners that may be affected

#### If you cannot seek shelter inside a building:

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*John Hatten with Delta Global Services*

### High Winds Plan

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- ✓ Tie down or tape GPU cord on jetway to keep from striking aircraft.
- ✓ Lower all stair units to lowest possible setting.
- ✓ Look at ramp and use common sense. Ask yourself what can be blown away.

NEVER PUT YOURSELF IN DANGER. IF HIGH WINDS OR SEVERE THUNDERSTORMS ALREADY EXIST, SEEK SHELTER IMMEDIATELY.

#### Weather Information:

Local Station Supervision/Management must stay alert to available sources that predict possible severe weather and keep ramp advised. Additionally, all personnel must be alert to the conditions around them, and take action or seek advice if the situation is perceived as potentially dangerous.

**Information sources include**, but are not limited to:

- ✓ Local or cable TV weather forecasts, alerts and warnings
- ✓ Local radio weather forecasts, alerts and warnings
- ✓ National Weather Service forecasts, alerts and warnings
- ✓ FAA Tower
- ✓ Pilot reports
- ✓ Personal observations
- ✓ Local airport authority
- ✓ Other airlines
- ✓ Internet weather sources



# NATA Safety 1st<sup>®</sup> eToolkit

## CONTINUING EDUCATION

Through continuing education, you and your team can enhance the professional skills needed to maximize personal and professional contributions to the day-to-day efficiency of your operation. We will provide learning opportunities in each monthly issue that may be of interest to you and your team.

### *NATA Safety 1st<sup>®</sup> Offerings:*

#### **Line Service Supervisor Training**

November 11 & 12, 2004 from 8 am – 5 pm,  
Sheraton Grand Hotel, Dallas/Ft. Worth Airport  
4440 West John Carpenter Freeway, Irving, Texas 75063

### *Other Offerings:*

#### **Aviation Safety Management with Security and Human Error Management**

October 25-30, 2004 (Five days, 9-hour days with an hour for lunch), Embry-Riddle Aeronautical University in Daytona Beach, Florida, Center for Aerospace Safety/Security Education, Online: <http://www.avsaf.org/case/register/index.html>  
Tele: 1 (866) 261-2464, Email: [jayme.Nichols@erau.edu](mailto:jayme.Nichols@erau.edu)

#### **University of Southern California**

#### **Aviation Safety Course Schedule 2004-2005**

[http://viterbi.usc.edu/pdfs/unstructured/aviation/Course\\_Schedule.htm](http://viterbi.usc.edu/pdfs/unstructured/aviation/Course_Schedule.htm)

#### **The George Washington University, Washington DC; Aviation Safety and Security Certificate Program**

<http://www.gwu.edu/~aviation/safetyandsecurity/safetyandsecurity.htm>

The NATA Safety 1st<sup>®</sup> eToolkit is brought to you by NATA Safety 1st<sup>®</sup> SMS and SH&E. SH&E is the leading expert in safety and operational integrity evaluations and safety management consulting. SH&E has developed a proprietary evaluation methodology, called Safety Architecture, which is unique within the industry as it focuses on systemic surveillance and process evaluation. This is a systems and controls look at how an operator manages those technical functions that support aviation operations.

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