SAE Aerospace
An SAE International Group

AEROSPACE INFORMATION REPORT

SAE AIR4905

Issued 1996-07
Reaffirmed 2011-05

Wheel Chocks

FOREWORD

The use of wheel chocks is the most common means to restrain an aircraft while it is parked. Wheel chocks may also be used as a back-up to aircraft parking brakes. Wheel chocks are used to restrain an aircraft from movement due to ground slope or normal wind velocities without engine power. During certain ground operations, chocks are unable to provide adequate restraint. Such is the case during engine run-ups or high wind conditions. Unsafe ground handling of aircraft and associated activities have resulted in serious personnel injuries, flight delays, and in some cases substantial damage to the aircraft. This SAE Aerospace Information Report (AIR) discusses a number of factors that affect wheel chock design and use.

1. SCOPE:

The purpose of this document is to present general considerations for the design and use of aircraft wheel chocks. The design and use of aircraft wheel chocks is a good deal more complicated than it may appear at first glance.

2. REFERENCES:

There are no referenced publications specified herein.

3. DESIGN CONSIDERATIONS:

Many decisions must be made when selecting the proper chock design depending on the application and the environment in which it is used. Factors that must be taken into account in the design of aircraft chocks include:

a. Material: Performance degradation and physical deterioration due to environmental factors such as temperature, sunlight, moisture, sand and dust, fungus, snow and ice, salt, fuel, oil, hydraulic fluid, and solvents must be considered.

TO PLACE A DOCUMENT ORDER: **Tel:** **877-606-7323 (inside USA and Canada)**
Tel: **724-776-4970 (outside USA)**
Fax: **724-776-0790**
Email: **CustomerService@sae.org**
SAE WEB ADDRESS: **http://www.sae.org**

SAE values your input. To provide feedback on this Technical Report, please visit http://www.sae.org/technical/standards/AIR4905

3. (Continued):

b. Width: Determined by the width of the aircraft tire(s) to be restrained and whether it will be used to restrain more than one wheel on an axle, or axle pair (i.e., if fore and aft on same bogie, different axles).

c. Height: Sized to adequately restrain the aircraft tire. Height of the wheel chock is primarily a function of the aircraft tire size. Typical chock heights range from 6 to 12 in (15.2 to 30.5 cm).

d. Weight: Should be light enough for ease of manual installation, yet heavy enough to preclude the possibility of blowing away due to jet blast or high wind conditions. Unsecured wheel chocks on the ramp pose a safety hazard to personnel and aircraft.

e. Shape: Typically have a triangular cross section, although polygonal and square cross sections are also available. An approximate 45° chock angle at the point at which the tire is contacted, provides maximum holding ability. A more gradual angle will allow the tire to run up the chock and pinch it. A steeper angle decreases the downward pressure on the chock, thus allowing it to slip more easily. Some chock designs incorporate a curved shape to provide maximum contact area with the aircraft tire. A laterally grooved surface will improve the gripping performance in adverse weather conditions.

   Appendix A illustrates typical aircraft wheel chock cross sections.

f. Strength: Material used to manufacture chock must be able to hold a fully loaded and fueled aircraft and not crush under the weight of the aircraft.

g. The durability of the chock to withstand operational usage including shock and vibration.

h. The applicability of the wheel chock to a wide variety of aircraft. Special purpose chocks should be identified with aircraft type(s) for which they are intended to be used.

i. Safety related aspects including the possibility of the chock being inadvertently blown away by jet blast or in high wind conditions.

j. Brightly colored wheel chocks provide maximum visibility on the ramp. Operators may wish to consider the addition of reflective material to chocks in order to provide visibility at night.

k. The ability to easily and safely carry, install, and remove the wheel chocks. A rope or handle attached to the chock may facilitate this requirement.

4. EVALUATION OF EXISTING DESIGNS:

4.1 Welded Metal Cages:

a. Moderate weight and very durable.

b. Disadvantage is that sharp metal edges may damage the aircraft tire.

c. More likely to cause damage to the airplane if flipped up during an incident.

d. The welded metal cage is more prone to skid and can cause a spark.

e. Highly resistant to oils, fuels, and chemicals.

f. Excellent holding capability on ice.

g. Will not rot or crack.

h. Must be painted or have reflective material added to improve visibility. Some maintenance required.

4.2 High Density Rubber Chocks:

a. Superior chocking on dry or wet concrete or asphalt because of the high coefficient of friction and large area in contact with the ramp.

b. This type of chock can be heavy. A typical extruded rubber chock 6 in (15.2 cm) high can weigh 8 to 10 lb/ft (11.9 to 14.9 kg/m), with lengths available up to 6 ft (1.83 m). The same size molded rubber chock may weigh up to 12 lb/ft (17.9 kg/m).

c. Poor holding capability on snow or ice unless equipped with removable cleats or spikes.

d. Highly resistant to oils, fuels, chemicals, and corrosion.

e. Indefinite lifetime (nonrecurring cost).

f. Will not break or crack.

g. Commonly molded only in black rubber. Chock may need to be painted or have reflective material added to improve visibility. Some maintenance required.

4.3 Urethane Chocks:

a. Have similar characteristics to rubber chocks, but can be made lighter by means of using a lighter filler or have hollow or foam filled centers.

b. Highly resistant to oils, fuels, chemicals, corrosion, and abrasion.

c. Indefinite lifetime (nonrecurring cost).

d. Can be molded in bright colors to provide maximum visibility. Never needs painting. No maintenance required.

e. Poor holding capability on snow or ice unless equipped with removable cleats, spikes, or a metal edge. Excellent holding characteristics on dry concrete or asphalt.

4.4 Wooden Chocks:

a. Most economical chock - typically made from No. 1 common fir lumber.

b. Average life of 15 to 20 months (recurring cost).

c. Excellent holding capability on dry or wet concrete or asphalt.

d. Prone to splintering (may be a safety issue). Also prone to rotting, breaking, and cracking; not weather resistant. Often need painting to maintain maximum visibility. Maintenance required.

4.5 Cleats/Spikes:

a. Can be bolted onto wooden, rubber, or urethane chocks to improve holding capability on ice or hard packed snow.

b. Usually made of metal. Can be as simple as a sharpened bolt protruding through the bottom of the chock.

c. Personnel should exercise caution when handling to ensure safety.