



Figure 15-36. Propeller electrical deice system schematic.

Any deposits of ice, snow, or frost on the external surfaces of an aircraft may drastically affect its performance. This may be due to reduced aerodynamic lift and increased aerodynamic drag resulting from the disturbed airflow over the airfoil surfaces, or it may be due to the weight of the deposit over the whole aircraft. The operation of an aircraft may also be seriously affected by the freezing of moisture in controls, hinges, valves, microswitches, or by the ingestion of ice into the engine. When aircraft are hangared to melt snow or frost, any melted snow or ice may freeze again if the aircraft is subsequently moved into subzero temperatures. Any measures taken to remove frozen deposits while the aircraft is on the ground must also prevent the possible refreezing of the liquid.

Frost Removal

Frost deposits can be removed by placing the aircraft in a warm hangar or by using a frost remover or deicing fluid. These fluids normally contain ethylene glycol and isopropyl alcohol and can be applied either by spray or by hand. It should be applied within 2 hours of flight. Deicing fluids may adversely affect windows or the exterior finish of the aircraft, only the type of fluid recommended by the aircraft manufacturer should be used. Transport category aircraft are often deiced on the ramp or a dedicated deicing location on the airport. Deicing trucks are used to spray the deicing and/or anti-icing fluid on aircraft surfaces. [Figure 15-37]

Deicing and Anti-icing of Transport Type Aircraft

Deicing Fluid

The deicing fluid must be accepted according to its type for holdover times, aerodynamic performance, and



Figure 15-37. An American Airlines aircraft being deiced at Syracuse Hancock International Airport.

material compatibility. The coloring of these fluids is also standardized. In general, glycol is colorless, Type-I fluids are orange, Type-II fluids are white/pale yellow, and Type-IV fluids are green. The color for Type-III fluid has not yet been determined.

When aircraft surfaces are contaminated by frozen moisture, they must be deiced prior to dispatch. When freezing precipitation exists, and there is a risk of contamination of the surface at the time of dispatch, aircraft surfaces must be anti-iced. If both deicing and anti-icing are required, the procedure may be performed in one or two steps. The selection of a one- or two-step process depends upon weather conditions, available equipment, available fluids, and the holdover time to be achieved.

Holdover Time (HOT)

Holdover Time (HOT) is the estimated time that deicing/anti-icing fluid prevents the formation of frost or ice and the accumulation of snow on the critical surfaces of an aircraft. HOT begins when the final application of deicing/anti-icing fluid commences and expires when the deicing/anti-icing fluid loses its effectiveness. Figure 15-38 shows a holdover timetable for Type IV fluid.

Critical Surfaces

Basically, all surfaces that have an aerodynamic, control, sensing, movement, or measuring function must be clean. These surfaces cannot necessarily be cleaned and protected in the same conventional deicing/anti-icing manner as the wings. Some areas require only a cleaning operation, while others need protection against freezing. The procedure of deicing may also vary according to aircraft limitations. The use of hot air may be required when deicing (e.g., landing gear or propellers).