Chapter 8

Removal of Rubber

8.1 GENERAL

8.1.1 Rubber deposited in the touchdown zone by tires of landing aeroplanes obliterates runway markings and, when wet, creates an extremely slick area on the runway surface. The removal of rubber is carried out by means of:

a) chemical solvents;

b) high-pressure water blasting;

c) chemical solvents and high-pressure water blasting; and

d) hot compressed air.

8.1.2 In assessing the effectiveness of any system for rubber removal, the objective must be clearly understood, i.e. to restore a good coefficient of friction in wet conditions so as to provide safe operational conditions for all aeroplanes. A change in surface colour, for example, from black to grey on Portland cement concrete can be very misleading, because even a small amount of residual rubber in the pores of the pavement can produce low friction values, while giving an overall clean appearance. It is therefore essential to quantify the friction coefficient by means of a reliable friction-measuring device.

8.1.3 In most cases, high-pressure water blasting is reasonably effective on lightly contaminated areas, but its effectiveness decreases as the depth of contamination increases. Depending upon the type and volume of traffic, cleaning may be required twice a year. A modern practice is to dissolve rubber deposits with chemical solvents followed by thorough flushing with high-pressure water blasting.

8.1.4 In order to determine the amount of rubber needed to be removed from the pavement to provide an acceptable surface condition, it is recommended that a test area be used to predetermine the water pressure and rate of travel required to produce this acceptable surface. Observed productivity of high-pressure water blasting during normal working conditions indicates a rate of 278 m^2 per hour per unit while cleaning. Refilling of a typical water tank accounts for approximately two hours in each eight-hour shift. Therefore, one touchdown zone 900 m × 24 m would require approximately 100 hours per unit.

8.1.5 The hot compressed air technique uses high-temperature gases to burn away the rubber deposits left by aeroplane tires and can be used on both Portland cement concrete and asphaltic concrete runways. It has been claimed that as no mechanical action takes place at the runway surface, there is little danger of the surfacing material becoming loose and causing foreign object ingestion. However, caution should be exercised and the condition of the pavement should be closely monitored when using this technique on asphaltic concrete runways.

8.2 CHEMICAL REMOVAL

8.2.1 Chemical solvents have been successfully used for removal of rubber deposits on both Portland cement concrete and asphaltic concrete runways. Chemicals having a base of cresylic acid (a derivative of creosote) and a blend of benzene, with a synthetic detergent for a wetting agent, are used for removal of rubber on concrete runways. For removal of rubber on asphalt runways, alkaline chemicals are applied.

8.2.2 The volatile and toxic nature of the cleaning compound dictates that EXTREME CARE be taken during and after application. If the chemical is allowed to remain on the surface for too long, the paint and possibly the pavement surface could be damaged. When washing the cleaning compound off the pavement surface, it must be so diluted that it will not harm the surrounding vegetation, drainage system or wildlife, or pollute nearby streams.

8.2.3 Since the application process consists of spraying the solvent solution on the contaminated area, waiting a

period of up to one hour, then washing and sweeping, it is likely that one touchdown zone 900 m × 24 m could be treated in one eight-hour shift. A modern practice for the removal of rubber from pavement surfaces is to dissolve rubber deposits with chemical solvents followed by thorough flushing with high-pressure water blasting.

8.3 MECHANICAL REMOVAL

8.3.1 *High-pressure water cleaner.* The equipment ranges from a single, manually operated nozzle (or gun) supplied by pump and water tender, to a sophisticated, self-propelled semi-trailer incorporating a pump, 22 700 L capacity water tank and oscillating high-pressure water spray bar (Figure 8-1). Pressures between 350 kg/cm^2 and 700 kg/cm^2 are common.

8.3.2 *Hot, compressed air cleaner.* The machine operates on an air/gas mixture fed into a combustion chamber where burning takes place. The resulting exhaust is emitted at about 400 m/s from orifices at a temperature of approximately 1 200°C directly onto the surface. These gases soften and shear off the rubber particles. When a hot compressed air cleaner is used on concrete surfaces, a small amount of carbon deposit is produced; this can be brushed from the surface of the concrete using a normal tractor- or truck-mounted brush machine which most airports already have. In the case of asphaltic concrete surfaces, a slightly rejuvenated surface is produced which is claimed to be a desirable effect.

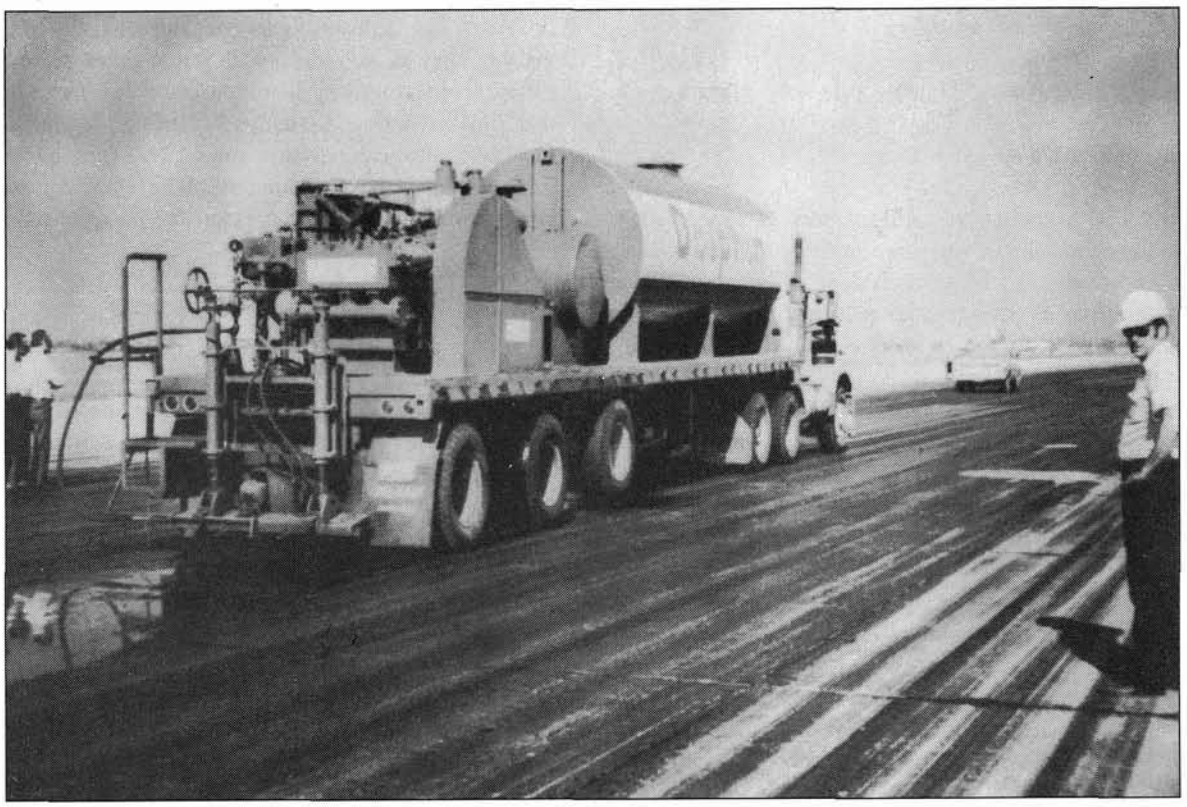

Figure 8-1. Oscillating high-pressure water vehicle