13. SOME EXPERIENCE WITH TIRE WEAR AND DAMAGE ON GROOVED RUNWAYS

By Robert H. Hout

Hill Air Force Base

The Ogden Air Materiel Area (OOAMA), Hill Air Force Base, Ogden, Utah, has the prime responsibility for new tires for out-of-production aircraft and the total responsibility for the retread tire program of the U.S. Air Force. Since March 1968, this command has become increasingly alarmed with tire tread stripping problems associated with the B-52 and KC-135 aircraft. It was not until July 1968 that OOAMA associated the grooved runway at Beale Air Force Base, California, as the primary contributory cause of this problem.

Castle Air Force Base, California, is presently involved with extensive crew training in B-52 and KC-135 aircraft. These aircraft perform a majority of their training touch-and-go landings at Beale AFB. The Castle AFB tire problems, therefore, have been directly associated with the grooved runway at Beale AFB.

Some recent published reports are claiming extensive improvements in traction with no tire damage during braking on grooved runways at slip ratios up to and well beyond peak braking. Contrary to these published reports, the Air Force is experiencing considerable damage, such as depicted in figures 1, 2, and 3, to cargo- and bomber-type aircraft tires. Considerable damage is also being inflicted on tires on some aircraft that are performing only touch-and-go training missions. This damage is being experienced on both new and retreaded tires.

A recent visit to three overseas Air Force Bases, which have grooved runway construction, revealed that the new tires on fighter aircraft were being badly chevron cut and some chipping was occurring. Base maintenance personnel were blaming the barrier cables on the runway for the damage; however, examination of the tires revealed them to be typical chevron-type cuts. The same aircraft operating from other bases, with the runway not grooved but equipped with barrier cables on the runway, are not experiencing the same type of damage.

OOAMA is presently exploring a new-tire procurement program entitled "Life Cycle Procurement" which involves a special testing program to evaluate wear and performance of each manufacturer's tire. The Air Force then procures tires based on performance instead of low bid price. This program is inducing manufacturers of new and retread tires to produce improved designs for competition. The present industry practice for tire qualification is a dynamic wheel test to a specific profile. This method of

qualification may not suffice for future procurement unless a specific service test is performed on a grooved runway for final qualification.

Hill AFB is impressed with the results of runway grooving for aircraft control in adverse weather conditions. This approach appears to be the most promising yet undertaken. It should be pointed out, though, that considerable work remains to be done to arrive at a workable solution. The tire manufacturers must be allowed to test their products further and thereby to arrive at a groove configuration or tire design that can be properly handled. Therefore, OOAMA recommends that further runway grooving on USAF runways be discontinued until the problems can be rectified. OOAMA also feels that commercial operators may be confronted with the same problems when the frequency of their operations on grooved runways reaches the level encountered by the Castle AFB aircraft.

OOAMA is deeply concerned with tire tread stripping. Safety of flight is involved in that a thrown tread can damage hydraulic lines, wheel wells, and gear uplock mechanisms. The Beale AFB runway is being swept daily for one aircraft to prevent jet engine compressor damage. Considerable research should be accomplished on the effects of runway grooving on tires from all manufacturers and retreaders. Rubber compounding or grooving configurations must be changed to correct the cited problems. Further grooving of any USAF runways at this time would negate the OOAMA current tire improvement program and pose serious safety-of-flight problems.
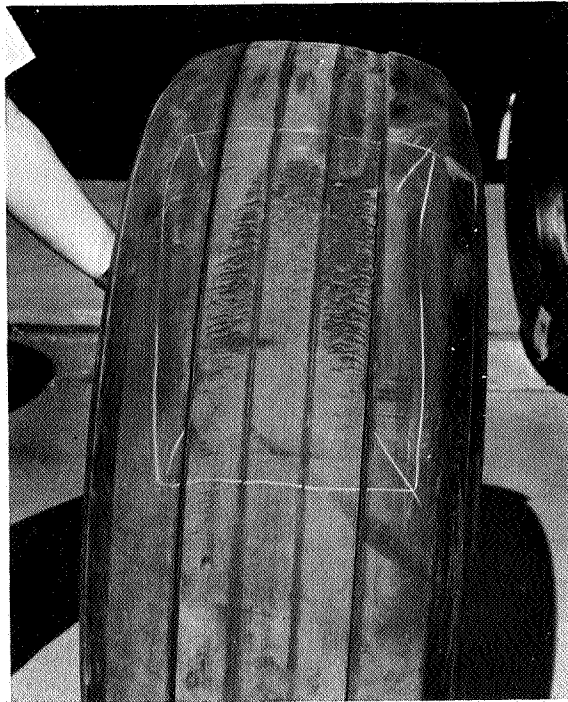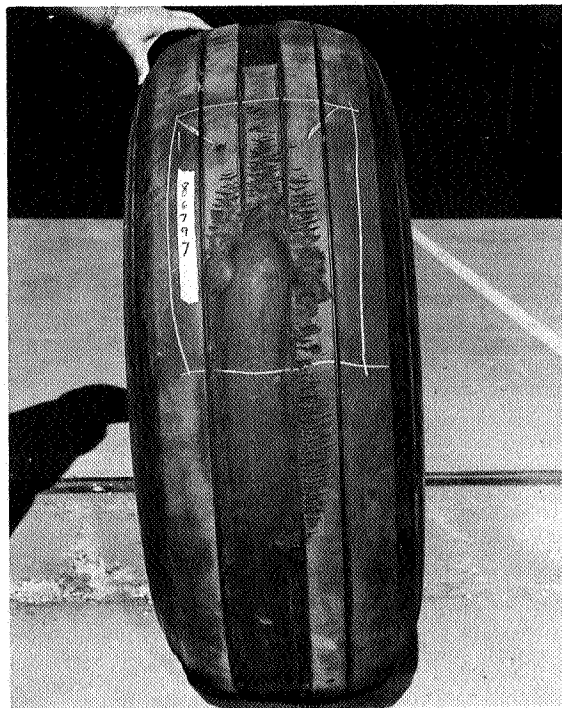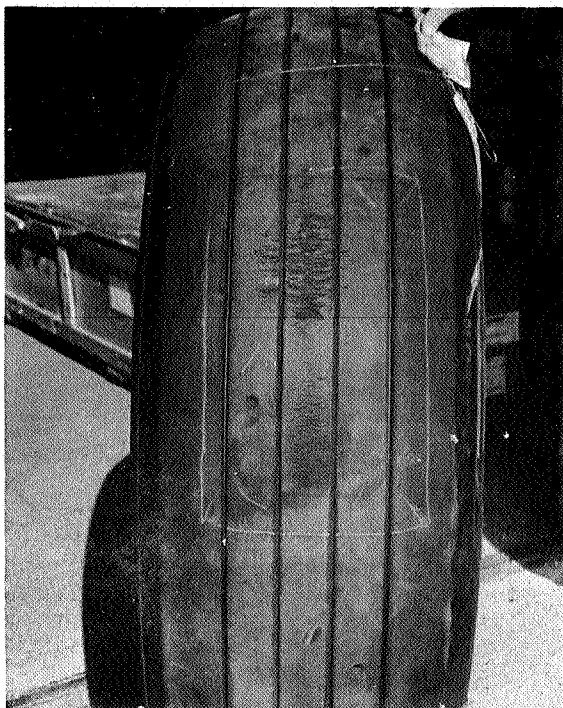
Figure 1

Figure 2

Figure 3