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ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SUBJECT: HIGH-SPEED TIRE MAINTENANCE AND OPERATIONAL PRACTICES

1. **PURPOSE.** This advisory circular provides information on the causes of aircraft tire failures and methods of increasing tire reliability.
2. **BACKGROUND.** Results of a recent study of aircraft high-speed tires (ground speed above 160 m.p.h.) show that a significant and frequent number of tire problems are occurring which can be alleviated by proper maintenance and operational practices. The study revealed that underinflated tires and foreign object damage (FOD) are two primary causes of the failures. Operational practices of flightcrews and maintenance personnel, while taxiing and towing aircraft, also have a significant bearing on tire life.
3. **SERVICING.** Tire manufacturers agree that an appropriate and vigorous maintenance program is essential to tire longevity and reliability.
 - a. Tire inflation checks should be performed on a daily basis, if feasible, using high quality instruments which have been carefully calibrated. Stick-type pressure indicators commonly used in automotive service stations are not recommended. It is recommended that nitrogen gas be used to service tires when feasible, because it is a deterrent to internal burning, tire explosion, and wheel corrosion.
 - b. Procedures for recording tire servicing should be established to aid in identifying chronic leakage problems. Tires with excessive air leakage should be removed from service.

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- c. Overdeflection of tire plys is caused by underinflation or tire overload. This condition causes increased tire ply temperatures that eventually result in tread separation and tire carcass failure. A tire located adjacent to a failed tire mate (tires on the same axle) should be removed if the tire has been operated in an overdeflected condition. The removed tire should be carefully inspected by an FAA-certificated repair station rated for retreading of high speed aircraft tires, to determine if structural ply damage has occurred. A record of facts and circumstances surrounding the reasons for removal should accompany the tire to the repair station. This information is invaluable in helping the repairman make a determination of airworthiness. Industry service experience has shown that early failure is predictable on overdeflected tires.
 - d. Overinflated tires wear out at center portions of the tread area, thus reducing overall tire life. Overinflation also reduces a tire's resistance to bruising, strains the tire beads, and reduces traction.
 - e. Safety practices and precautions recommended by the tire manufacturer, or other approved programs, should be strictly observed by persons servicing tires. Tires and servicing equipment should be inspected for condition before servicing.
- 4. INSPECTION PROCEDURES. A rigorous tire inspection program should be developed to meet all environmental requirements of the intended operation. The operator should assure that the program is being complied with, including strict adherence to established tire damage criteria.
 - 5. FOREIGN OBJECT DAMAGE. Airport managers and aircraft operators/owners are encouraged to keep airport ramps, taxiways, runways, and hangar floors free of debris which could damage tires. Regularly scheduled cleaning should be accomplished, preferably daily. Industry experts concur that foreign object damage generally leads to tire failure, premature removal, or scrapping of otherwise serviceable tires.
 - 6. OPERATIONAL PROCEDURES. Flightcrews and maintenance personnel taxiing or towing aircraft should observe aircraft manufacturer recommended operational procedures. Large radius turns at low speed help prevent tire shoulder scrubbing and overdeflection. Nose wheel tires are sometimes subjected to short-turn maneuvers which can cause bead separation from the wheel flanges, resulting in partial or complete loss of tire pressure.


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