

Tire Overspeed Landing Test

RATIONALE

Overspeed landing is an emergency condition that can occur with certain aircraft requiring the aircraft to land at a speed higher than the design norm. For this condition, a standardized test method is needed to demonstrate a tire's capability to withstand this condition. This revision clarifies the relationship and the acceptance criterion for a tire passing the overspeed landing test, demonstrating a tire's capability to withstand the landing of an aircraft experiencing this condition.

1. SCOPE

This document covers the basis of, and test procedure for, an overspeed landing test on aircraft tires with rated speeds of 190 mph (306 km/h) and above. The conditions requiring an overspeed test, alternatives, test requirements and pass/fail criteria are addressed.

1.1 Purpose

The purpose of this ARP is to define a test procedure for the qualification of aircraft tires to an overspeed landing requirement.

2. REFERENCES

There are no referenced publications specified herein.

3. OVERSPEED LANDING TEST JUSTIFICATION

3.1 Definition

An overspeed landing is a landing which is made at a speed above the rated speed of the tire. This landing is typically the result of a failure condition on the aircraft, but may also occur if landing over the aircraft maximum landing weight at a high altitude airport on a hot day with a significant tailwind

3.2 Applicability

The overspeed landing requirements arise from failure conditions on the airplane, specifically failures which preclude getting the aircraft into a normal landing configuration. This failure may result in an overspeed landing, if the failure occurred when the airplane was near takeoff weight and the means or time were not available to dump fuel. Each aircraft should be evaluated as to the applicability of this test.

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3.3 Alternatives

Demonstrating overspeed landing capability of a tire is an alternative to the selection of a tire with a speed rating sufficient to meet this failure condition. Since the overspeed landing is a rare occurrence and is related to a failure, use of a higher speed rated tire is not recommended. The intent of this test is to insure that if such a failure occurs, the tires will have sufficient capability to make a successful landing. Continued serviceability of the tire is not required.

4. TEST DEFINITION

4.1 Test Specimen

The test tire may be either a new tire or a tire used in other testing. The tire should be at its full molded tread depth. The tire should be inflated at room temperature to the rated pressure (corrected for flywheel curvature).

4.2 Test Parameters

The temperature of the tire carcass or contained gas shall be at least 105 °F (40.5 °C) at the start of the test. No adjustment in tire pressure may be made during the test. Tire load shall be as specified by the airframer or rated load. The initial speed shall not exceed rated speed plus 25 mph (40 km/h). The 25 mph represents a reasonable margin over rated speed, capable of covering most failure conditions. If the overspeed landing requirement for the airplane is higher than 25 mph over the rated speed of the tire, consideration should be given to a tire with a higher speed rating.

4.3 Test Conduction

If the Universal Load-Speed-Time Curve of Figure 1 is being used, the tire shall be subjected to one cycle as shown in Table 1:

TABLE 1 – TEST CONDITION UNIVERSAL LOAD-SPEED-TIME CURVE

Symbol	Time (s)	Speed (mph)	Load
T ₀	0	Up to rated + 25	0
T ₁	2	Up to rated + 25	As specified or rated
T ₂	End	0	As specified or rated

The end time should be determined using a deceleration of 5 ft/s² (1.52 m/s²) from the initial velocity to a complete stop. In any case, the total roll distance should not exceed 13 500 ft (4115 m). The 13 500 ft roll distance represents the maximum expected runway length available for stopping.

If the Rational Load-Speed-Time Curve of Figure 2 is being used, the tire shall be subjected to one cycle as shown in Table 2. The ramp up of load and ramp down of speed will be specific to the airframe under test and will be supplied by the airframer.

TABLE 2 – TEST CONDITION FOR RATIONAL LOAD-SPEED-TIME CURVE

Symbol	Time (s)	Speed (mph)	Load
T ₀	0	Up to rated + 25	0
T ₁	End	0	As specified or rated

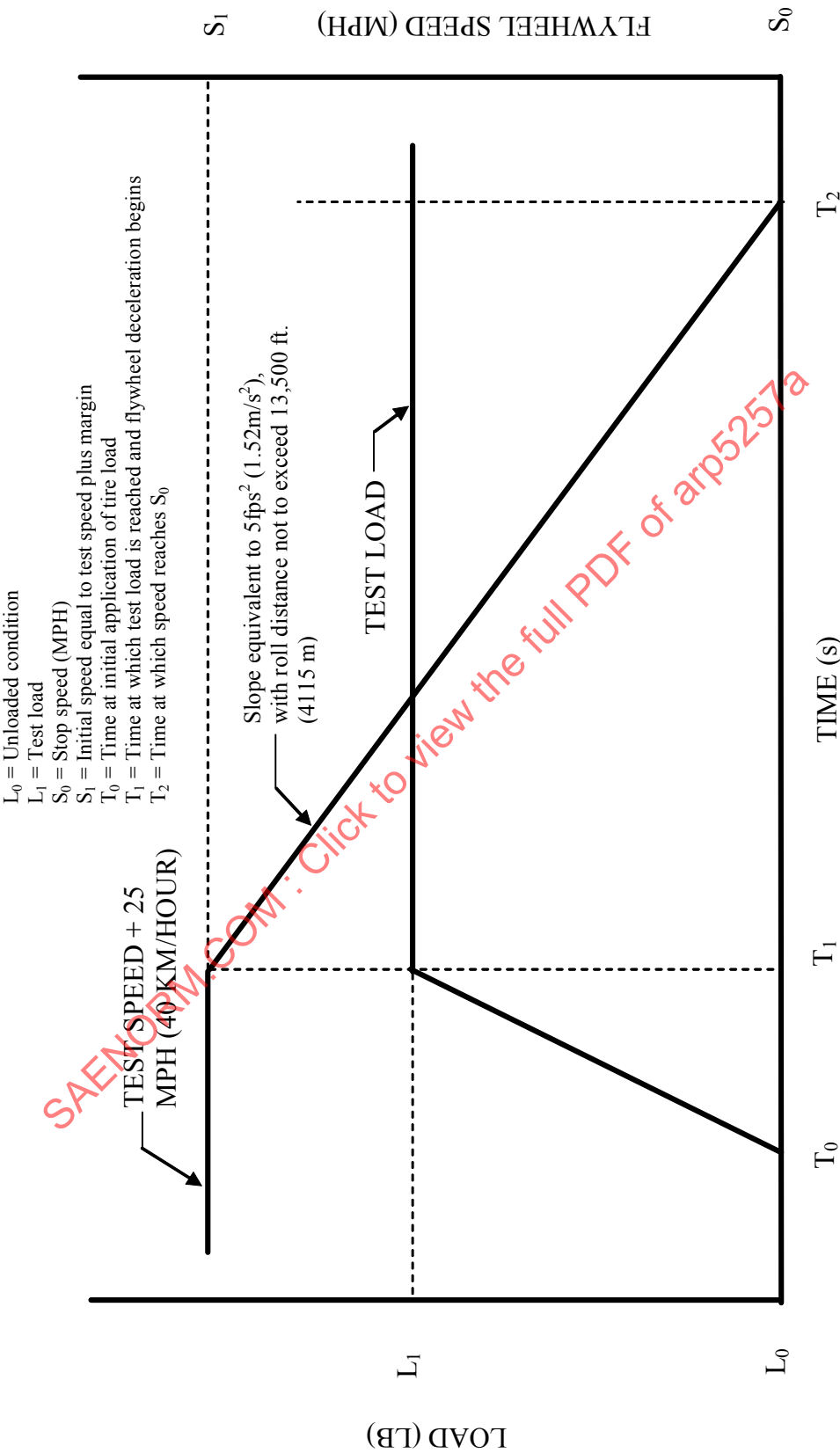


FIGURE 1 – GRAPHIC REPRESENTATION OF A TYPICAL UNIVERSAL OVERSPEED LANDING
LOAD-SPEED-TIME TEST CYCLE

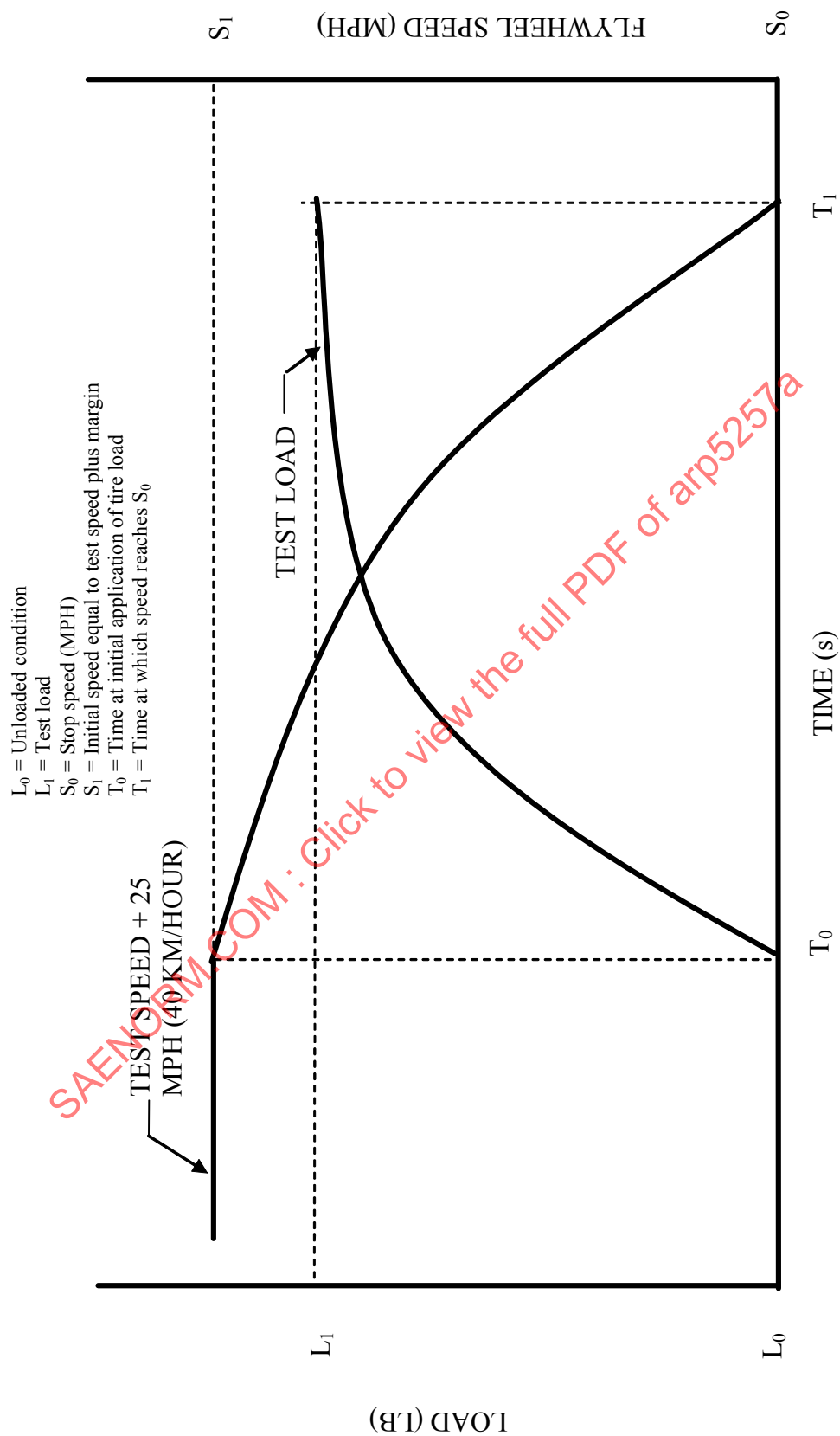


FIGURE 2 – GRAPHIC REPRESENTATION OF A TYPICAL RATIONAL OVERSPEED LANDING
LOAD-SPEED-TIME TEST CYCLE