RESTRICTED

HEADQUARTERS, ARMY AIR FORCES
WASHINGTON 25, D. C.

TECHNICAL ORDER
NO. 01-60J-25

10 July 1944

AIRPLANES AND MAINTENANCE PARTS

NORTH AMERICAN - DIVE LIMITATIONS - P-51B, P-51C, AND P-51D

NOTE The publication of this Technical Order has been expedited as the instructions contained herein are of vital importance and should be disseminated to all affected personnel without delay. As prescribed in T. O. No. 00-20A, appropriate reference to this Technical Order will be entered on AAF Forms 60-A for the airplanes affected. The work directed in paragraph 5. will be accomplished as soon as possible and not later than the next 25-hour inspection period by service activities with the aid of base maintenance facilities, if necessary. Commanding Officers will be responsible for bringing this Technical Order to the attention of all pilots cleared for operation of subject aircraft as well as those undergoing Transition Flying Training as contemplated in AAF Regulation 50-16.

1. All modern high speed, high altitude airplanes are affected by compressibility to a varying degree. Compressibility phenomena are caused by the formation of compression waves or shock waves in the air flowing over the wings and other parts of the airplane when the true air speed of the airplane approaches the speed of sound. These phenomena may be evidenced by occurrence of instability, uncontrollable rolling or pitching, or stiffness of controls, or combinations of these effects. The exact speed at which compressibility effects are noticed varies with different airplane models and with the condition of the airplane with respect to fit of cowling, cover fairings, fillets, inspection doors, etc, and with surface finish.

2. The first compressibility effects occur on the P-51 series airplanes at a speed approximately 75 percent of the speed of sound and are evidenced by a tendency of the airplane to porpoise. The pilot's indicated air speed corresponding to 75 percent of the speed of sound at various altitudes on the P-51B, P-51C, P-51D airplanes is shown in the following tables in the form of limit diving speeds versus altitude. Note, however, that at the lower altitudes the speed of sound does not govern, and the limiting air speed becomes a structural consideration only; hence, the present red line value of 505 mph is shown in the charts for the lower altitudes. The difference in speeds between the P-51B and P-51C chart and the P-51D chart is caused by the difference in the pitot tube installations.

3. Flight tests have been conducted during which the speeds noted in the charts were exceeded and porpoising was encountered. This porpoising starts at approximately the speeds shown above and increases in intensity as the air speed is further increased. At the present time, tests with airplanes completely instrumented so as to accurately determine air speed and altitude have not exceeded the above speeds beyond approximately 30 mph at the lower altitudes and approximately 20 mph at the higher altitudes. The airplane did not exhibit any unusual characteristics in these tests other than the previously described porpoising. However, the above-listed limits should not normally be exceeded, since compressibility effects may be evidenced in a more violent manner if allowed to progress. If through necessity or inadvertence the above speeds are exceeded and pronounced compressibility effects in one or more of the above-described forms are experienced, recovery

P-51B, P-51C

Limit Diving Speeds

Pressure Altitude (feet)	Pilot's Indicated Air Speed (mph)
40,000	270
35,000	305
30,000	340
25,000	385
20,000	420
15,000	465
10,000	505
5,000	505
0	505

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P-51D

Limit Diving Speeds

Pressure Altitude (feet)	Pilot's Indicated Air Speed (mph)
40,000	260
35,000	290
30,000	325
25,000	365
20,000	400
15,000	440
10,000	480
5,000	505
0	505

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should be effected by gradual reduction in power and gradual pull-up. CARE MUST BE EXERCISED IN PULL-OUTS, SINCE THE STICK FORCES ARE RELATIVELY LIGHT AND ABRUPT PULL-OUT MAY CAUSE STRUCTURAL FAILURE. THE ELEVATOR TRIM TAB WILL NORMALLY NOT BE REQUIRED TO AID RECOVERY. HOWEVER, IF FOUND NECESSARY IT SHOULD BE USED WITH CARE AND IN SMALL INCREMENTS.

5. All P-51B and P-51C airplanes and P-51D airplanes shall have the applicable placard containing flight restrictions as listed in paragraph 2., placed in the airplane where it can be readily seen by the pilot.

By Command of General ARNOLD:

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