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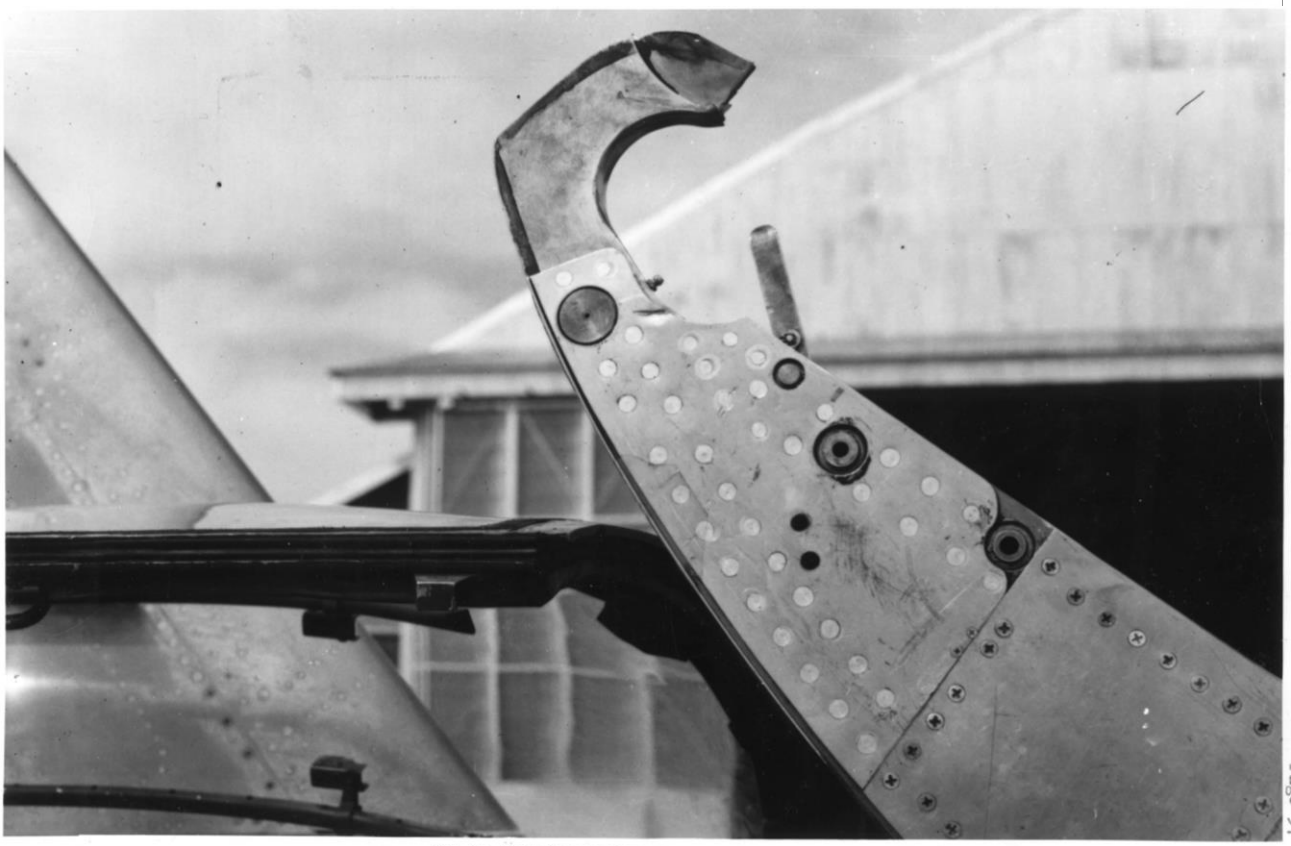
This document, edited by Cesare Brizio, was generated in February 2021 by Optical Character Recognition and subsequent manual editing of an original mimeographed copy from The Schoch Collection. For a better understanding of the damage occurred to the sky hook, two pictures were added: one showing the complete sky hook tip after one of the unsuccessful hook-on on a previous flight, and one of the sky hook tip after the 5th flight of the 524, described in this Pilot's Report.

D4E-13117 XF-85 POINT OF CONTACT WITH TRAPEZE BAR DURING ATTEMPTED HOOK-ON.



XF-85 DAMAGE TO SKY HOOK HEAD FIT. 524-5

PILOT'S FLIGHT REPORT

PILOT: E.F. Schoch

DATE: 22 October 1948

FLIGHT NO: 524-5

WEATHER: CAVU

PROJECT: XF-85

FLIGHT TIME: 36 minutes

PURPOSE: Hook-on practice and check on directional stability.

WEIGHT AND C.G. 5900 lbs; 22% MAC

CHANGES SINCE LAST FLIGHT: Hook-fairing removed.

CONFIGURATION: Belly skid attached.

INSTRUMENTATION: Standard Flight Test

ALTITUDE AND PROCEDURES: At about 20,000' P.A. and 185 mph IAS feel out directional control while attached to the trapeze. Release if satisfactory, check directional control at 185 mph and hook-on. Release and perform measured yaws at 200 mph with the hook up and down. Check longitudinal trim and control up to about 300 mph IAS.

RESULTS:

1. The airplane, on the trapeze felt much the way it did before. It is controllable directionally with the use of the rudder and no noticeable change in stability was apparent.
2. On the release - the handle was pulled but did not release. The airplane was then pulled up on the hook by use of the elevator. The hook then opened, however, the airplane came back up towards the trapeze a little and then was nosed down. The trim settings for the release were 7° nose up tab and 10500 RPM at an altitude of about 20,000'.
3. When the plane was flown out to the side it immediately began to yaw uncomfortably with practically any control surface movement. It seemed to stay in the yaw until return by use of the rudder. For this reason it was decided not to attempt a hook-on at 185 mph IAS. The airplane was then flown at about 225 mph IAS or so in shallow turns and level flight. The airspeed was then reduced to 200 mph IAS and measured yaws executed to the right and left. The airplane was so light directionally that the amount of rudder used was restricted to about 5°. The hook was then retracted and the airplane immediately tightened up directionally. There was no further tendency to go into a yaw and remain there. However, it still did not feel too good at 200 mph IAS. Measured yaws were then executed right and left at 200 mph IAS with hook down. Maximum speed attained was

about 290 mph IAS with the hook down and the airplane seemed normal. However, small amplitude directional oscillations were still apparent. Due to high elevator forces it was rather difficult to make tight turns although the ailerons felt fine. The airplane was then slowed to about 235 mph IAS and, with the Project Engineer's permission, the hook was raised. This was accomplished smoothly with no tendency for the mechanism to overextend or slam back. A measured yaw was then executed at 225 mph IAS following which the airplane was flown back to the EB-29.

4. On the first attempt to hook on the closure was good until about four or five feet away from the trapeze bar when a tendency for the airplane to roll or skid became apparent. The approach came within a foot or two but was so overcontrolled that I dropped back.
5. On the second approach the airplane was brought to within about three feet of the bar and power was added to close the distance. The lunge for the bar missed, however, and the tip of the hook just touched the bar.
6. I relaxed after the second attempt and came up and tried again. I was not able to close under good control. The closure came within about two or three feet but ended with a tendency to bob up so sharp forward stick was applied. A rather high rate of descent was attained and the airplane pulled up too sharply, resulting in an accelerated stall with the airplane tending to fall off on the right wing. There was some buffeting in the stall but the airplane was controllable.
7. The airplane was then flown back into formation and another attempt made to hook on with no improvement. The airplane was difficult to control laterally or possibly directionally inasmuch as it had a tendency to go from one side to the other. The attempt finally ended up with considerable power on, a little high and fairly close to the bar. Forward stick was applied with the hope of catching the hook. This was partially successful in that contact was made with the front portion of the hook which broke due to the high rate of descent at the time of contact.
8. The airplane was then flown down to Rogers Lake and a hook down landing on the skid accomplished with no difficulty. The flare out for the skid landing on the lake was fine. Control and visibility were good with the hook down. The approach was made at about 220 mph IAS and allowed ample time for a flare out. The speed brake was utilized during the final approach to reduce the flare out. The speed brake was then retracted and the airplane leveled off ten to twenty feet above the lake. The engine was cut clear off and the plane allowed to float on down with a gradual increase in the angle of attack. The shock of landing was sharp but the run out was straight ahead veering slightly to the left. Subsequent measurement indicated that the airplane skidded for about 1440 feet.

COMMENTS

1. Four main facts, when all apparent at the same time, seemed to overcome pilot technique and prevent a successful hook-on. They were as follows:
   - Small longitudinal trim changes required constant control as the trapeze bar was approached closer than about five to seven feet.
   - The extremely low directional stability resulted in yaws and skids out of the desired flight path. It was impossible to keep from overcontrolling the airplane directionally and sometimes longitudinally with this condition.
   - The increase in drag as the final approach was made required several power changes and it is believed there was a definite longitudinal trim change with power.
   - The sluggish power response to throttle movement and the fair amount of throttle friction made power control difficult.
2. Any of the above items by itself, except the directional stability, would probably be inconsequential but together each added a small measure of control difficulty finally overcoming the pilot's ability to make a successful hook-on.
3. It is believed that with the hook fairings installed the airplane was amply controllable for a safe hook-on to the present trapeze, although the present trapeze arrangement on the EB-29 resulted in considerable interference on the XF-85 and required many minute control changes (mainly longitudinal) during the final (about five feet) closure to the bar.
4. Removal of the hook fairing resulted in such low dynamic and directional stability that when added to the small longitudinal trim changes, control near the trapeze bar was extremely difficult. The low forces for control, the slow response to directional control surface movement, and the tendency for the airplane to yaw at any disturbance made the hook-on impossible. As the airplane tended to skid from side to side, it was difficult to maintain a straight flight path close behind the trapeze bar at any time.
5. Relocation of the trapeze bar to a clear air area should reduce the longitudinal and power control problems as the bar is approached. Also, redesign of the hook and trapeze to more flexible structures would aid the power control problem as well as reduce the requirements on the pilot since he would have a feeling of more latitude for hook-on, rather then aiming for point to point contact with practically zero speed differential.
6. The writer believes that air to air hook-ons are entirely feasible and that it is quite possible to overcome the difficulties encountered in the present arrangement.

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Experimental Test Pilot

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