

Early Ejection Seats in Germany

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In 1939, the Heinkel Corporation in Germany designed an ejection seat for testing in high-performance aircrafts. Although there had been several previous ejection seats that had been designed, this was the first compressed air operational ejection seat ever produced. The jet-powered Heinkel He 178 was the first plane to be equipped with the newly designed seat on its first flight from Rostock on 27th August 1939. During the war, more than 1000 of these ejection seats were delivered by the Heinkel Corporation, resulting in dozens of pilots being saved.

However, 1 year before, in 1938, a catapult seat had been constructed for flight testing with the Junkers Ju 88 in Berlin. Dr. Sigfried Ruff and Dr. Hans Wiesehofer flight-tested this ejection seat in the fighter-bomber Junkers Ju 87 "Stuka." This high-G aircraft was modified to carry the ejection seat for in-flight dummy tests in its back seat.

Ejection seats were also developed by Focke-Wulff and by Dornier, but were not widely used. The Focke-Wulff seat was accelerated pyrotechnically with a cartridge and reached speeds of $11 \text{ m} \cdot \text{s}^{-1}$ and an acceleration of up to 18 G. It was first installed in the Tank Ta 154 "Moskito." The jet-driven Heinkel He 162 "Volksjaeger" was equipped with Focke-Wulff catapult seats which were also driven by cartridges. The advantages of cartridges were in weight savings, lower maintenance costs, and greater security as compared to the compressed air versions. The Doenier ejection seat was used in the Schempp-Hirth Goe 9. Before ejection could take place in that plane, the propeller and rudder had to be blasted off the airframe to reduce the average acceleration to a more acceptable 12.5 G.

The more advanced Heinkel seats were powered by compressed air and had an acceleration range between 9.75 and 14 G_z. This rescue technology was first tested with a vertical ejection trajectory. Following that the seat's practical usability was proved at the Luftwaffe's Test Center in Rechlin just south of Rostock. The first tests were performed with in-flight dummies before test subjects were ejected. Parachute test subject Wilhelm Buss was the first to be ejected from a plane. After several flight tests at the Rechlin Test Center demonstrated its practicability, further flight testing ended due to the urgent need for ejection seat capability for active flight personnel. By a directive of the Air Ministry, after 1944, all prototype airplanes had to be equipped with this rescue ejection seat technology.

The compressed air driven Heinkel ejection seats were also widely used in the Heinkel fighter He 162 "Volksjaeger." Nearly 180 ejection seats were built for this plane. Three times that number were installed in the Heinkel He 219 "Uhu," a double seat night fighter. The Heinkel seats were also used in the Dornier heavy fighter Do 335 "Pfeil," the fighter bomber Heinkel He 177 (2 each), and the Heinkel fighter He 280. One of the He 280 test pilots, Helmut Schenk, became the first person to escape from a stricken aircraft with an ejection seat on 13 January 1942 after his control surfaces iced up and became inoperative.

The Heinkel ejection seats were also used in several test flights such as the Junkers Ju 290 and the Messerschmitt Me 262. The ejection seat hardware had a weight of only 120 kg. The seat itself had a weight of 25 kg and the parachute 9 kg. It could eject an 80-kg pilot in flight. The ejection time was 0.12 s and the acceleration was 11.5 G_z.

The Luftwaffe's testing report from the Rechlin tests documents the in-flight testing of the Heinkel He 219 ejection seat. Forty ejections using test dummies were followed by three ejections of test subjects. In ground testing on an additional 10 test subjects, the maximum acceptable ejection pressure was determined to be 100 to 105 atm (atmospheres, ATÜ) for the pilot seat. The back ejection seat was limited to a maximum of 85 to 90 atm. It was already known that the maximum human tolerance for ejection seats was limited to ejections of 20 G_z. Most early German ejection seats limited themselves to 12 G_z.

However, from a medical ethics standpoint, the testing was highly questionable, as the 10 "volunteer" test subjects were taken from the Sachsenhausen concentration camp, being a part of a group of prison-workers for the Heinkel Corporation. The historical archive papers mention that the test subjects were criminal Germans. They were obviously abused by being coerced to volunteer as test subjects for experiments that were health-endangering. However, no injuries or deaths were reported. It appears that the vast majority of the ejection seat testing in Germany was performed by test subjects who were volunteer technicians and other specialists. After World War II, the need for such systems became pressing, as aircraft speeds were getting ever higher, and it was not long before the sound barrier was broken. Manual escape at such speeds would have been impossible. In the final analysis, the technical revolution of this new rescue capability certainly had a tremendous impact, enabling the subsequent rapid advancement of jet aircraft technology.

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