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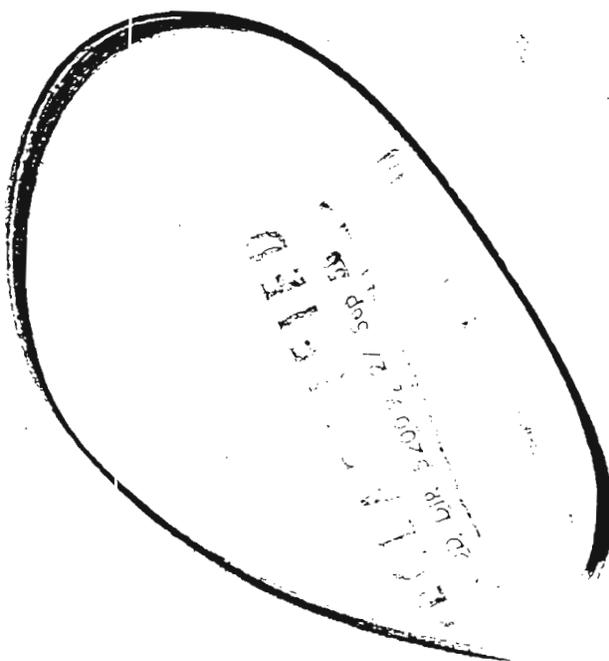


BOX: 287.56-13 287.57-1

FOLDER:
00176588

HISTORICAL DATA
903rd AAF BASE UNIT
AAF CENTER
PINECASTLE ARMY AIR FIELD
PINECASTLE, FLORIDA

00176575



Historical Record



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30 H-301B
905D AAF BASE UNIT (PAAF)
AFTAC, ORLANDO, FLA

JWD/ERN/TMB/mv - 2

25 May 1945

Army Air Forces Board Project No. 3-4562

"Test of VB-2 (2,000 lb Azon Bomb)"

I. OBJECT:

1. To compare the operational performance of the VB-2 to the operational performance of VB-1.
2. To determine if the VB-2 is operationally suitable as a combat weapon.
3. To determine methods of employment.

II. FACTUAL ELEMENTS OF THE PROJECT:

1. The VB-2 Azon bomb is a high angle bomb which allows lateral control while in flight, by radio. The word "Azon" is derived from the two words "Azimuth Only", no range corrections being possible with this bomb, while in flight.

a. The operating mechanism of the VB-2 tail unit is self contained allowing it to be mounted on the standard AN/M-68 bomb. Its basic components are: A small 24 volt lead storage battery for its internally contained power source, a gyro unit for stabilizing its vertical axis, a super-generative receiver for amplifying and analyzing the control signals transmitted to it, servo units for activating the controls, ailerons for establishing the vertical axis, rudders for applying the corrections desired, and a 800,000 candle-power flare-guide.

b. The requirements in the way of special installations and equipment in the operating aircraft consists of simple circuits for supplying an external source of power and arming the flare arming circuit in each ship, and a special transmitter in each controlling aircraft.

2. The tests have been carried out in this organization over a period of four (4) months.

a. The bomb as originally designed was for use against high priority targets of very narrow width, such as bridges, railroads, piers, etc. When used against targets of this type the weapon proves very satisfactory.

b. Apparently when the unit was designed it was

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not taken into consideration that the bomb must be carried in the bomb bay of certain types of aircraft. Therefore the tail unit required considerable modification which delayed the project somewhat. This modification has since been standardized.

c. Low order detonation which occurred in a great number of AN/M-36 bombs made the spotting of strikes from the photographs difficult.

d. Numerous failures of flare guide type T-7-E1 made control impossible above 10,000 feet. Green flare guide type T-8 proved unsatisfactory above 15,000 feet due to the fact the bombardier was unable to follow the bomb down to the strike, also making the photography difficult.

e. In drops made from B-24 type aircraft the bombardier found it was very difficult to get into a position which would allow him to follow the bombs down. A number of transmitting antennas on B-24 type aircraft, due to its overhanging location on the tail, were damaged in landing.

f. The condition which the excessive removal of insulation at the connections resulted and poor jobs of soldering which was noticed in most of the tail units was blamed for at least two bomb failures and then required additional rework.

g. As is the VB-1, the VB-2 bomb is not believed to be entirely satisfactory in mass drops controlled by one bombardier.

h. The accuracy of the bomb at present falls off sharply above 15,000 feet. Also a greater amount of malfunctions will be encountered at higher altitudes.

(1) At 10,000 feet and below the bombardier is able to follow the flight of the bomb without aid of the flare-guide, if necessary.

(2) In drops made above 15,000 it was noted that the bomb reacted very well for approximately the first 15,000 feet. However, after a fall of approximately 15,000 feet the bomb would not react to control given. Information gained from these drops indicate that the bomb, at present, is not satisfactory for altitudes above 15,000 feet.

i. The maintenance problems experienced with VB-2 tails have been identical with those experienced in the past with VB-1 tails, except for one or two minor points.

(1) VB-2 tails use the same gyro, radio, battery, and other component parts. The tails have been loaded in

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the ship after the 2,000 pound bombs, in the same manner as was done with VB-1 tails. Missions have been carried out both in B-17's and B-24's.

(2) In the B-17, however, it is necessary to tilt the tails so that the rudders are set at 35° with the vertical in the left bomb bay and 55° with the vertical in the right bomb bay. This makes it necessary to set the directional gyro angle at 35° for the tails to be loaded in the left bomb bay and 55° for tails to be loaded in the right bomb bay. This apparently makes no difference in the stabilizing of the bomb after release and is necessary only in the case of the B-17's.

(3) In addition to the point mentioned above a little more trouble was experienced in matching receivers and tails in such a way as to keep the same overall low sensitivity.

j. A rule of thumb for bombardiers on the number of mils to be set into the bombsight can be had by adding 25% to the mils value found in the tables for the M-66 bomb. This is calculated from the ratios of their drag coefficients, i.e., 0.240 for the M-66 and 0.308 for the VB-2 equipped M-66. (The mils of trail are directly proportional to the drag coefficients of the bombs considered).

III. CONCLUSIONS: It is concluded that:-

1. The operational performance of the VB-2, as compared to the VB-1, can be considered the same up to 15,000 feet; however, above 15,000 feet the error of the VB-2, at present, increases greatly. Deflection error within 50 feet can be repeatedly obtained by a skilled operator at altitudes between 10,000 and 15,000 feet when the proper point of observation is obtained.

2. The VB-2 is believed to be operationally suitable as a combat weapon on targets of narrow width.

a. Great accuracy may be obtained at altitudes not to exceed 15,000 feet, and over targets where it is possible for the dropping aircraft to maintain a course, after bombs away, which is in a vertical plane between the target and the release point.

3. The best practical method of employment is for each bombardier to control his own bomb, possibly making repeated runs with individual releases. This may be done either by the leader sighting for range and deflection and releasing all bombs in the formation by use of ABR, or the lead bombardier sighting for range and deflection and all other bombardiers sighting for range only. In larger formations where there are not sufficient radio control

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channels for each bombardier, the element leaders may control all bombs in his element.

IV. RECOMMENDATIONS: It is recommended that:-

1. A suitable number of AN/CRW-7 receivers be obtained to replace the AN/CRW-2A receivers so as to conduct sufficient tests to determine whether the VB-2 failures, which have been encountered above 15,000 feet, are due to the super-regenerative receivers.

2. If the use of the amplifier AN/33-ARG proves satisfactory in the employment of VB-1, a sufficient number of tests be made on VB-2 to determine if the bomb may be used more satisfactorily from higher altitudes by use of AN/33-ARG.

3. Since it is believed possible to modify the AN/CRW-2A and the AN/CRW-7 so as to control two bombs from the same transmitter, that this be done for tests, and two controllers from the same aircraft control the bombs from that aircraft simultaneously.

4. A more thorough inspection of the tail units be carried out at the factory so as to eliminate the great amount of re-work that must be done in the field. For example, better insulation on naked wires and joints, more careful soldering at connections, etc., with particular care given to the kickout switches, with a test made at high voltage.

5. The location of the transmitting antenna on the B-24 type aircraft be changed to the wing, because in its present location, on the tail, the antenna is often damaged in landing.

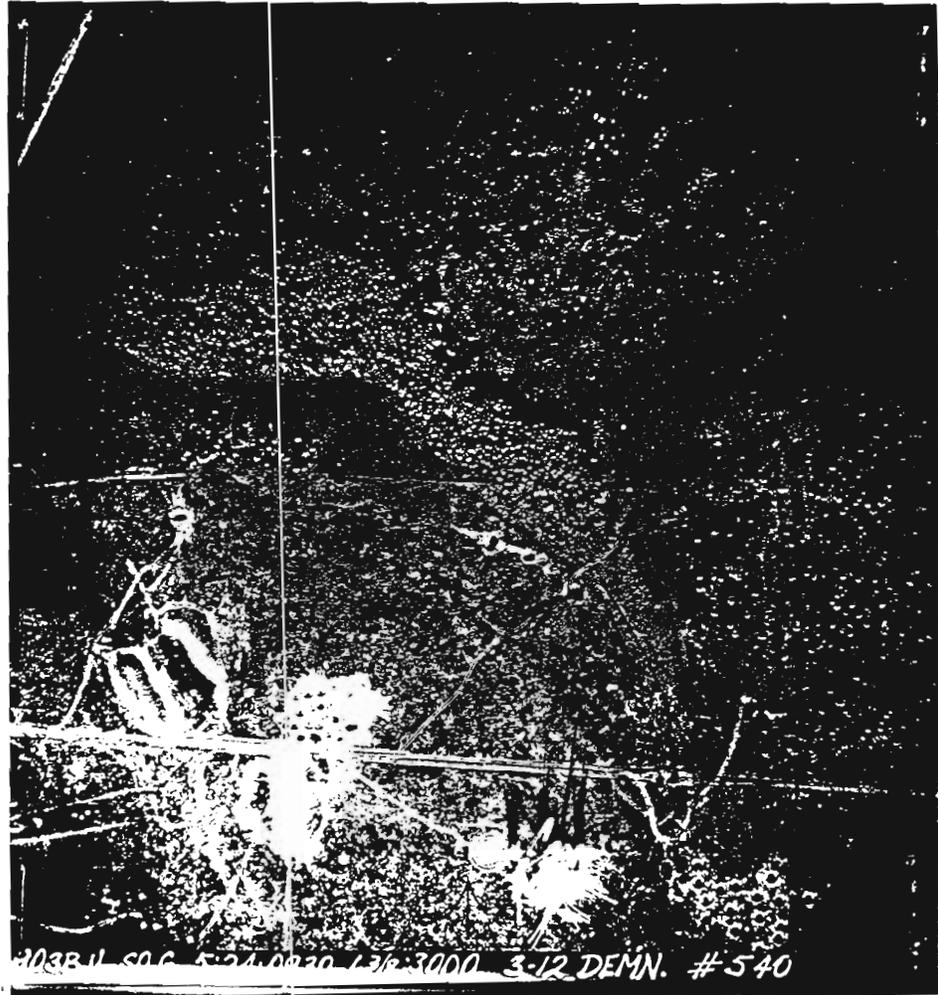
6. That a window be installed in the armor plate to the right and slightly behind the stabilizer to allow the bombardiers to visually follow the flight of the bombs.

7. The slot in the servo motor coupling arm be cut deeper. When a right control is applied and the servo actuating arm pen strikes the bottom of the slot the servo motor has a tendency to lift itself from its base.

V. ENCLOSURES:

1. Log of VB-2 Missions.
2. Daily Log.
3. Photographs with negatives. (Request negatives be returned).
4. Photographs of the bombs in flight and their strikes.

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Bomb Strikes - 3-12 Demonstration
Run by SA G-903d EU

II-D-7