

FOX TWO REHEAT !

CALCULATION ALGORITHMS FOR
FOX TWO REHEAT !
WARGAMES RULES FOR MODERN AIR COMBAT
1950 TO THE PRESENT DAY

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GAME ALGORITHMS

Introduction

Fox Two Reheat was written specifically for the use of jet aircraft in the supersonic age, and therefore has very few data entries for piston-engined propeller aircraft, all of which will have quite low values which will also be very similar to one another. We have been asked by several users of the rules about the aircraft of the Korean Conflict at the end of the 1940's, which presents a conundrum for us. The first jet combat between fighters took place in this war, and therefore these jets are included in the rules. The mainstay of the airforces remained, however, piston-engined propeller aircraft. For those of a technical mind who would like to work out their own Stats for aircraft not included in the tables, these are the algorithms used to prepare the game data. We do not intend to publish any additional aircraft of this type ourselves. If you would like to enjoy the breath of publicity with any game data that you create, we would be happy to create a "users" page on the website, where your works can be examined and used by other players.

Calculation rules

Rounding is carried out only at the very end of the calculation, when you are defining the actual game value, normally upwards for a value of 0.5 or greater. It is strongly recommended that you either use a software spreadsheet such as MS-Excel, or a calculator set to show 3 decimal places. Make sure that the displayed number has not been rounded itself, so that 0.49 may be displayed as 0.5, which will give you misleading results.

Data Required

- Date in Service... this is the year of introduction, and must be later than 1945.
- Crew... The number of crew who have a specific function within the scope of the rules.
- Thrust... This is expressed in pounds of thrust for jet aircraft. For the purposes of a propeller aircraft use the total horsepower of the engines. This is used as part of the calculations of the Defence Value and Climb Rates.
- Maximum Airspeed in MPH... This will give the Game Airspeed, the Minimum Speed, the Dive and the Climb Rates.
- Maximum Take Off weight in pounds... Stores weight in pounds... Together these define the combat weight of an aircraft, and this in turn provides the Hit Points and is also used in further calculations.
- Pylons... are used with the Stores weight to determine the internal and external mounting points on an aircraft. Pylons are specifically used to carry Air to Air missiles. The split between Internal, External and Pylon is subjective and quite variable.
- Aircraft dimensions in the form of... Wing area in Square Feet and span in feet and inches provide data for the calculation of the Defence Value, the Manoeuvre Ratings and the Aerobic Modifiers. Convert the span to a value in feet by dividing the inches by 12 and adding to the feet.
- Ceiling in feet... this is converted to height bands, and finally the climb rates are calculated (a two stage process).

Algorithms

The algorithms are laid out in the order in which you need to calculate them. In many cases the results of one step are used later on in others. The symbol \pm denotes that you round to the nearest whole number at this point. Items shown in [Square Brackets] are the unrounded results of a calculation and are used in various subsequent formulae. Items shown in (Round Brackets) are the game values as summarised in the Aircraft Data section in the rules.

- *Tech Level (TL) = Square Root of (Date in Service - 1945) \pm
 - [Air Speed] = Maximum Airspeed in MPH * 0.01738
*Game Speed (AS) = [Air Speed] \pm
*Stall Speed (VMIN) depends on the result of [Air Speed].
If [Air Speed] < 12.88 then (VMIN) = [Airspeed] x 0.25 \pm
If [Air Speed] \Rightarrow 12.88 then (VMIN) = 3.22 \pm
Dive Rates are also based on [Air Speed] as follows:
*Shallow (Sh) = [Airspeed] x 0.075 \pm
*Steep (Stp) = [Airspeed] x 0.15 \pm
*Power (Pwr) = [Airspeed] x 0.225 \pm
*Vertical (Vert) = [Airspeed] x 0.3 \pm
 - [Combat Weight] = Maximum Take Off Weight - Stores Weight
*Hit Points (Dam) = Square Root ([Combat Weight]) x 0.1 \pm
*Stores Points = Stores Weight \div 2000 \pm
Stores are set to 0 on civilian aircraft.
 - *Manoeuvre Value Clean (MvC) = [Combat Weight] \div (Wing Area x 25) x Square Root (Wing Span \div 27) \pm
*Manoeuvre Value Loaded (MvL) = Maximum Take Off Weight \div (Wing Area x 25) x Square Root (Wing Span \div 27) \pm
*Aerobic Modifier Clean (ABC) = 3.22 - ([Combat Weight] \div (Wing Area x 25) x Square Root (Wing Span \div 27) \pm
*Aerobic Modifier Loaded (ABL) = 3.22 - Maximum Take Off Weight \div (Wing Area x 25) x Square Root (Wing Span \div 27) \pm
*Defence Value Clean (DVC) = (Square Root (1.5 x Thrust \div [Combat Weight]) x 10) + 3.8 \pm
*Defence Value Loaded (DVL) = (Square Root (1.5 x Thrust \div Maximum Take Off Weight) x 10) + 3.8 \pm
 - *Ceiling (Ceil) = Ceiling in feet \div 5000 \pm
[Climb Clean] = (((Thrust x 10) \div [Combat Weight]) - 1) x Maximum Airspeed in MPH x 0.00018248
*Climb Rate Clean (CliC)...
If [Climb Clean] is less than 0.1, it is set to 0.1. If it is more than 0.1 and less than 1, it is set to one decimal place (i.e. between 0.1 and 0.). Otherwise it is rounded \pm .
[Climb Loaded] = (((Thrust x 10) \div Maximum Take Off Weight) - 1) x Maximum Airspeed in MPH x 0.00018248
*Climb Rate Loaded (CliL)...
If [Climb Loaded] is less than 0.1, it is set to 0.1. If it is more than 0.1 and less than 1, it is set to one decimal place (i.e. between 0.1 and 0.). Otherwise it is rounded \pm .
 - *Points Value (PV). The normal value for most aircraft is Dam x (AS + DVC + Stores Points + Pylons + Gun Value*) \div (10 + MVC) \pm
If the aircraft is an ECM aircraft the cost is multiplied by 4 before rounding.
- * Gun Value is the sum of the damage dice of all the guns mounted in the aircraft.