HOW THE PENETRATION EQUATIONS WORK

Using William Kreizner's Penetration Troop Weapon System Requisition Equation, The P.Tw.R. Equation calculate the number of tanks needed to penetrate, or breakthrough a hostile line of battle,in which the enemy line of battle has a weapon system area, Atw, in which one tank will have a vertical interval of 400 meters, and a horizontal interval of 400 meters. The opposing battle line to be penetrated will have a tank weapon system area of Atw =(400m)(400m)= 160,000 meters squared for every one enemy tank. Calculate the number of tanks needed to penetrate a line of battle with an Efficient Penetration Column Area 2DFw. The factors that will be needed to be substituted into the P.Tw.R. Equation in order for us to determine how many tanks will be needed to breakthrough or penetrate the enemy line of battle is calculated as follows. The depth of the enemy line is 2000 meters, so we substitute 2000 meters for depth D. In this particular case the kill exchange ratio between the two contending forces is equal where Fp=Ff, therefore the flank resistance angle a=45°, because a=Arctan(Fp/Ff=1)=45°, and therefore we substitute 45° for the flank resistance angle a°. Now we need to plan for the minimum width that will allow the penetration column to pass through the rear of the enemy line, this is the egressing breadth Be, which is Be=590.68 meters. In this particular case of the Efficient Penetration Column Area, we will omit the range clearance factor Rb so that Rb=0. Because we are undertaking an efficient penetration operation we have an L value of two times the depth D, or L=2D for an efficient size penetration force. In summary, we have all the factors we need to substitute into the P.Tw.R. Equation in order to find out how many tanks we need to breakthrough the hostile line of battle. Depth D=2000 meters, Atw= 160,000m/Tank, Fp=Ff, a°=45°, Be=590.68m, Rb=0, L=2D

$$Tw = \frac{\frac{L2D}{Tan(Arctan(Fp/Ff)} + LBe + L2Rb}{Atw} = Tw = \frac{\frac{2D2D}{Tan(Arctan(Fp/Ff))} + 2DBe + 2D2Rb}{Atw}$$

$$Tw = \frac{\frac{4D^2}{Tan(Arctan(1))} + 2DBe + 2D(0)}{Atw} = Tw = \frac{\frac{4D^2}{Tan(45°)} + 2DBe + 0}{Atw}$$

$$Tw = \frac{\frac{4D^2}{1} + 2DBe}{Atw} = Tw = \frac{4(2000m)^2 + 2(2000m)(590.68m)}{160,000m^2/Tank}$$

$$\frac{16,000,000m^2 + 2,362,720m^2}{160,000m^2/Tank} = Tw = \frac{18,362,720m^2}{160,000m^2/Tank} = Tw = 115 \text{ TANKS}$$

Tw = 115 TANKS REQUIRED TO BREAKTHROUGH THE LINE OF BATTLE

Utilizing the Penetration Frontage Equation calculate the frontal width of the Penetration Column, given Rb=0, Fp=Ff, D=2000m, Be=590.68m, a°=45°

$$Fw = \frac{2D}{Tan(Arctan(Fp/Ff)} + Be + 2Rb = \frac{2(2000m)}{Tan(45°)} + 590.68m + 0 = \frac{4000m}{1} + 590.68m$$

Fw = 4000m + 590.68m = Fw = 4590.68 meters = The Frontal Width Of The Penetration Column