Incorporating Equations into Technical Documents

Technical reports often include equations within the text. Equations do not require a caption but there are some rules you need to follow when adding equations.

Guidelines for incorporating equations within the text

➤ Simple equations that do not require more vertical space than the normal body text can be included, using italics, within the sentence. For example:

> The radius of rotation was calculated using $F_c = mv^2/r$. Using the value obtained for r, we were able to calculate the acceleration of the system, using $a_c = v^2/r$.

➤ Equations that occupy more vertical space should be offset from the text, as follows:

> Total resistance for the system was obtained using:
>
> $$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \cdots$$

➤ If an equation is going to be used or referred to more than once in the document, you should number such equations sequentially, starting with 1. Be sure to consistently identify each equation on the right hand side, using one of the following ways:

$$\sin \alpha \pm \sin \beta = 2 \sin \tfrac{1}{2}(\alpha \pm \beta) \cos \tfrac{1}{2}(\alpha \mp \beta) \qquad \text{(Equation 1)}$$

OR

$$E = \tfrac{1}{2}\rho g A h_-^2 \qquad \text{Eq. 1}$$

OR

$$r = \tfrac{1}{2}at^2 + v_o t + r_0 \qquad (1)$$

➢ Refer to each equation in the text by using the numbering style associated with it. For example:

- "The relationship between A and B, as given by Equation 1, indicates that …"
- "Using Eq. 1, it can be seen that…"
- "Using (1), we find that …"

➢ Once an equation has been displayed and numbered, it can be referred to in subsequent uses by its identifying number. For example:

- "Using (1), we were able to substitute the value obtained for x into (2) to obtain the …"
- "Acceleration was determined using Eq. 2 and then substituted into … "

➢ It is often necessary to include text below each offset equation to indicate what each variable stands for. For example:

The coefficient of fluid drag (C_d) is given by:

$$C_d = \frac{F_d}{\frac{1}{2}\rho v^2 A_\rho} \hspace{3cm} \text{Equation 1}$$

where F_d is the drag force, ρ is the fluid density, v is the velocity of the object relative to the fluid, and A_ρ is the area that the force acts upon.

Here are a couple of ways to add equations to your documents.

➢ You can use the Equation function in Word, found under the Insert tab.

➢ If you use Windows, you can use the Math Input Panel, found under Accessories in the start menu, or within the Ink Equation feature, depending on the version of Word you are using.