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Industrial Parameters Formulas

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List of 12 Industrial Parameters Formulas

Industrial Parameters

1) Annual Devaluation Rate

$$fx \quad f_c = \frac{i_{fc} - i_{u.s}}{1 + i_{u.s}}$$

[Open Calculator !\[\]\(a870788d6ed9b8fd294b7654a8c8526b_img.jpg\)](#)

$$ex \quad 0.1875 = \frac{18 - 15}{1 + 15}$$

2) Binomial Distribution

$$fx \quad P_{\text{binomial}} = n_{\text{trials}}! \cdot p^x \cdot \frac{q^{n_{\text{trials}} - x}}{x! \cdot (n_{\text{trials}} - x)!}$$

[Open Calculator !\[\]\(c50c8b7b2cc2cf9ff925edec0ee94c0d_img.jpg\)](#)

$$ex \quad 0.193536 = 7! \cdot (0.6)^3 \cdot \frac{(0.4)^{7-3}}{3! \cdot (7-3)!}$$

3) Crashing

$$fx \quad CS = \frac{CC - NC}{NT - CT}$$

[Open Calculator !\[\]\(f60b7a900783ac3fd531bfd9c111be6d_img.jpg\)](#)

$$ex \quad 55 = \frac{1400 - 300}{129620s - 129600s}$$



4) Forecasting Error

$$fx \quad e_t = D_t - F_t$$

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235_img.jpg\)](#)

$$ex \quad 5 = 45 - 40$$

5) General Sewing Data

$$fx \quad GSD = \frac{M \cdot W_T}{T}$$

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0_img.jpg\)](#)

$$ex \quad 2.666667 = \frac{50 \cdot 28800s}{150}$$

6) Learning Factor

$$fx \quad k = \frac{\log_{10}(a_1) - \log_{10}(a_n)}{\log_{10}} (n_{tasks})$$

[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f_img.jpg\)](#)

$$ex \quad 0.458157 = \frac{\log_{10}(3600s) - \log_{10}(1200s)}{\log_{10}} (11)$$

7) Macroscopic Traffic Density

$$fx \quad K_c = \frac{Q_i}{\frac{V_m}{0.277778}}$$

[Open Calculator !\[\]\(b64b40baaee5acddc1eab8538ba84754_img.jpg\)](#)

$$ex \quad 33.33336 = \frac{1000}{\frac{30km/h}{0.277778}}$$



8) Normal Distribution Open Calculator 


$$fx \quad P_{\text{normal}} = \frac{e^{-\frac{(x-\mu)^2}{2\cdot\sigma^2}}}{\sigma \cdot \sqrt{2 \cdot \pi}}$$

$$ex \quad 0.096667 = \frac{e^{-\frac{(3-2)^2}{2\cdot(4)^2}}}{4 \cdot \sqrt{2 \cdot \pi}}$$

9) Poisson Distribution Open Calculator 

$$fx \quad P_{\text{poisson}} = \mu^x \cdot \frac{e^{-\mu}}{x!}$$

$$ex \quad 0.180447 = (2)^3 \cdot \frac{e^{-2}}{3!}$$

10) Reorder Point Open Calculator 

$$fx \quad RP = DL + S$$

$$ex \quad 4435 = 1875 + 2560$$

11) Traffic Intensity Open Calculator 

$$fx \quad \rho = \frac{\lambda_a}{\mu}$$

$$ex \quad 0.9 = \frac{1800}{2000}$$



12) Variance

[Open Calculator !\[\]\(bd1a142de767a21e5362c595f844a4ff_img.jpg\)](#)

$$\text{fx } \sigma^2 = \left(\frac{t_p - t_0}{6} \right)^2$$

$$\text{ex } 40000 = \left(\frac{174000\text{s} - 172800\text{s}}{6} \right)^2$$



Variables Used



- μ Mean Service Rate
- a_1 Time for Task 1 (Second)
- a_n Time for n Tasks (Second)
- **CC** Crash Cost
- **CS** Cost Slope
- **CT** Crash Time (Second)
- D_t Observed Value at Time t
- **DL** Lead Time Demand
- e_t Forecasting Error
- f_c Annual Devaluation Rate
- F_t Smooth Averaged Forecast for Period t
- **GSD** GSD
- i_{fc} Rate of Return Foreign Currency
- $i_{u.s}$ Rate of Return USD
- **k** Learning Factor
- K_c Traffic Density in vpm
- **M** Man Power
- n_{tasks} Number of Tasks
- n_{trials} Number of Trials
- **NC** Normal Cost
- **NT** Normal Time (Second)
- **p** Probability of Success of Single Trial



- **P_{binomial}** Binomial Distribution
- **P_{normal}** Normal Distribution
- **P_{poisson}** Poisson Distribution
- **q** Probability of Failure of Single Trial
- **Q_i** Hourly Flow Rate in vph
- **RP** Reorder Point
- **S** Safety Stock
- **T** Target
- **t₀** Optimistic Time (Second)
- **t_p** Pessimistic Time (Second)
- **V_m** Avg. Travel Speed (Kilometer per Hour)
- **W_T** Work Hours (Second)
- **x** Specific Outcomes within Trials
- **λ_a** Mean Arrival Rate
- **μ** Mean of Distribution
- **ρ** Traffic Intensity
- **σ** Standard Deviation of distribution
- **σ²** Variance



Constants, Functions, Measurements used

- **Constant: pi**, 3.14159265358979323846264338327950288
Archimedes' constant
- **Constant: e**, 2.71828182845904523536028747135266249
Napier's constant
- **Function: log10**, $\log_{10}(\text{Number})$
The common logarithm, also known as the base-10 logarithm or the decimal logarithm, is a mathematical function that is the inverse of the exponential function.
- **Function: sqrt**, $\text{sqrt}(\text{Number})$
A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.
- **Measurement: Time** in Second (s)
Time Unit Conversion 
- **Measurement: Speed** in Kilometer per Hour (km/h)
Speed Unit Conversion 



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- **Industrial Parameters Formulas** 
- **Manufacturing and Purchase Model Formulas** 
- **Time Estimation Formulas** 

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