

Queuing Rule of Thumb based on M/M/s Queuing Theory with Applications in Construction Management

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Abstract

Keywords:

Introduction

Case Study 1: Concreting

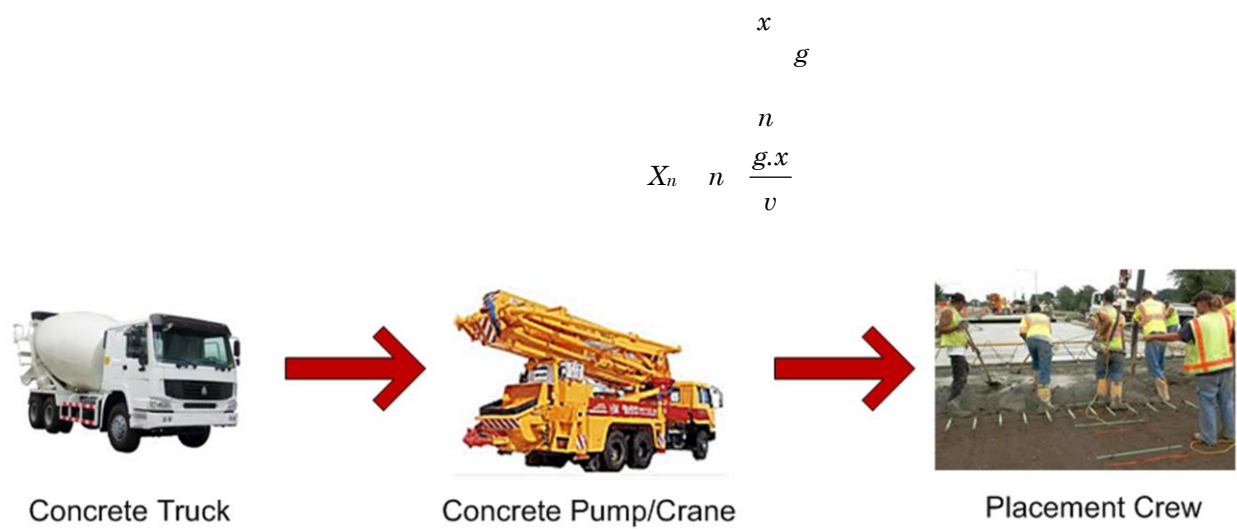


Figure 1.

$$c_c = \quad (\quad t)$$

$$c_c \quad t.$$

$$t$$

$$C = s \; c_s + W \; c_c$$

$$W$$

$$s$$

$$C$$

Case Study 2: Earth Moving

$$C_s \quad constant$$

$$function \quad C_c$$

$$C_c$$

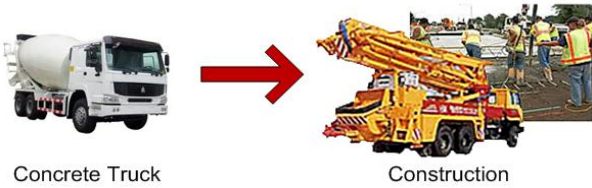


Figure 2.

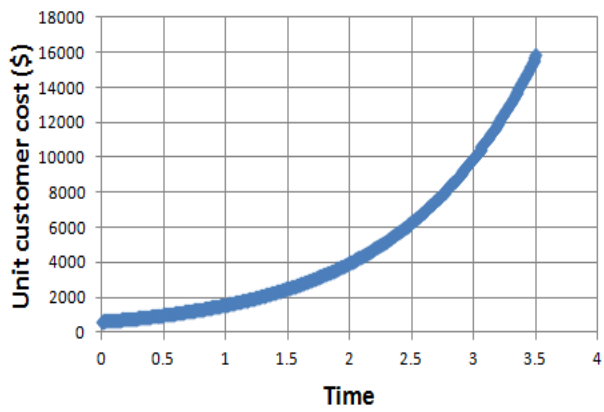


Figure 3.



Figure 4.

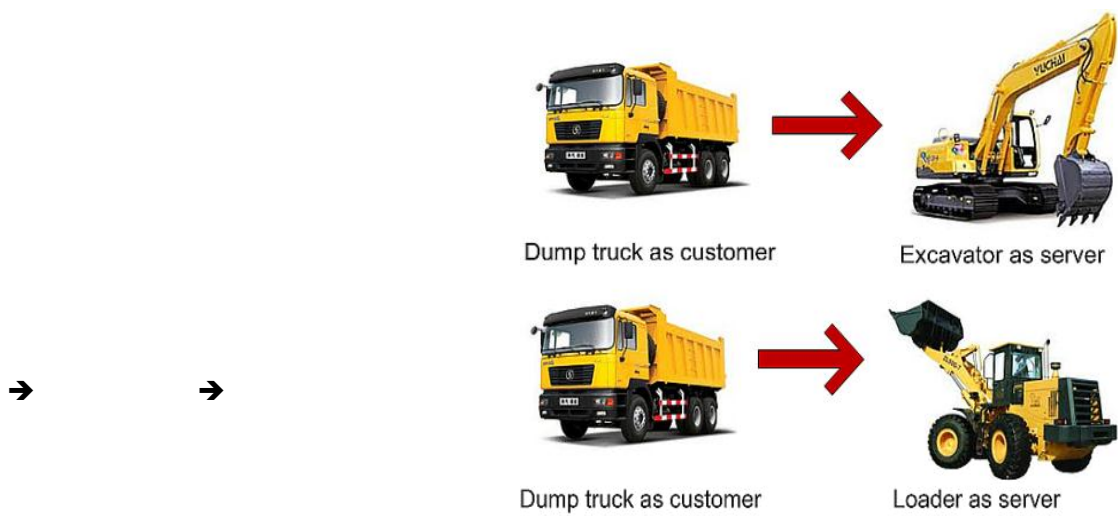


Figure 5.

Queuing Models

$$L=L_q+\frac{P_0}{s}\frac{s-1}{s!}$$

$$P_0=\sum_{i=0}^{s-1}\frac{\lambda^i}{i!}+\frac{\lambda^s}{s!}\frac{1}{1-\rho}$$

—

$$W=\frac{L}{\lambda}$$

s

$$C_s \qquad C_a$$

$$-1 \qquad a$$

$$L_q(G/G/s)=L_q(M/M/s)+\frac{c_a^2+c_s^2}{2}$$

$$P_0$$

$$U = \frac{\rho}{s} = \frac{\rho}{s} - 1$$

Queuing Analysis

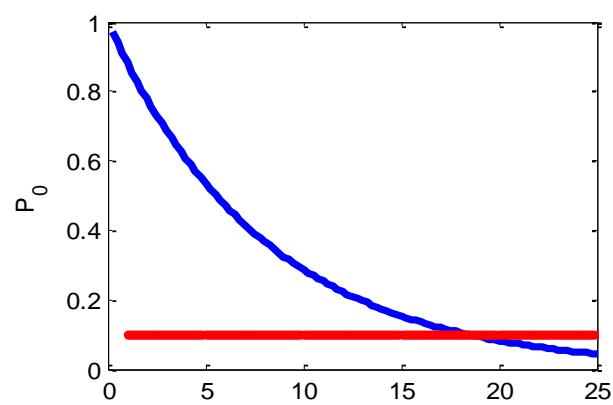


Figure 6.

C_s

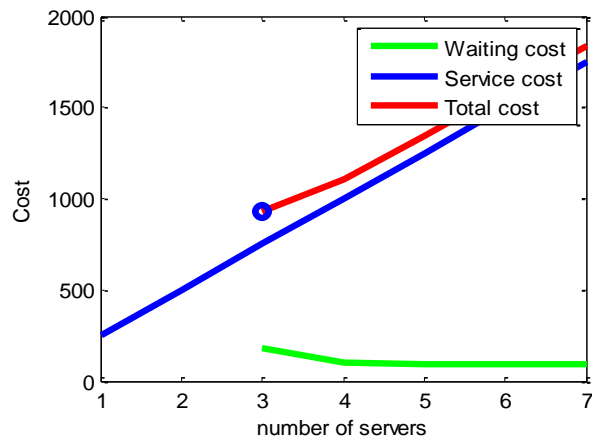


Figure 7.

Conclusions and Summary

Queuing Rule of Thumb

$$s \frac{N}{T}$$

References

Project Management for Construction - Fundamental Concepts for Owners, Engineers, Architects and Builders

Queueing Models with Fuzzy Data in Construction Management in: W. Fellin et al (Editors) Analyzing Uncertainty in Civil Engineering

Construction Management Process Reengineering Performance Measurements, Automation in Construction 18

Vacation Queueing Theory Model – Theory and Application

Advances in Queueing Theory and Network Applications

Queueing Methods for Services and Manufacturing

Construction Management and Economics

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