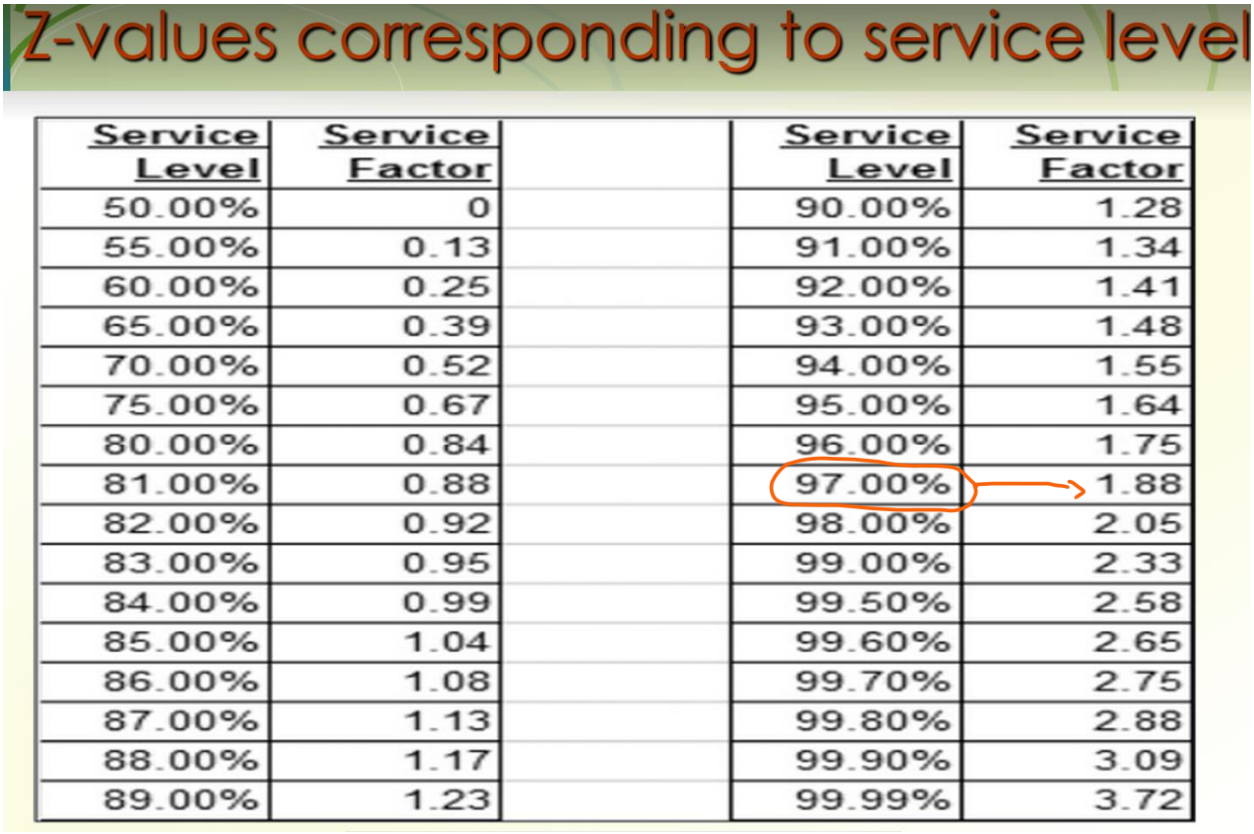

Service Level	Service Factor		Service Level	Service Factor
50.00%	0		90.00%	1.28
55.00%	0.13		91.00%	1.34
60.00%	0.25		92.00%	1.41
65.00%	0.39		93.00%	1.48
70.00%	0.52		94.00%	1.55
75.00%	0.67		95.00%	1.64
80.00%	0.84		96.00%	1.75
81.00%	0.88		97.00%	1.88
82.00%	0.92		98.00%	2.05
83.00%	0.95		99.00%	2.33
84.00%	0.99		99.50%	2.58
85.00%	1.04		99.60%	2.65
86.00%	1.08		99.70%	2.75
87.00%	1.13		99.80%	2.88
88.00%	1.17		99.90%	3.09
89.00%	1.23		99.99%	3.72

When to Reorder? Reorder Point Determination

1. **The expected demand during lead time and its standard deviation are available. In this case the formula is:**

$$SS = z\sigma_{dL}$$

i.e.,

$$R = dL + z\sigma_{dL}$$

R = reorder point with safety stock
d = average daily demand
L = lead time in days
z = number of standard deviations associated with desired service level
σ = standard deviation of demand during lead time

Suppose the manager of a construction supply house determined from historical records that demand for sand during lead time averages 50 tons. In addition, suppose the manager determined that demand during lead time could be described by a normal distribution that has a mean of 50 tons and standard deviation of 5 tons. Answer the questions, assuming that the manager is willing to accept a stock out risk of no more than 3 percent.

a. What value of z is appropriate?

Service level= 97%

$$z = 1.88$$

b. How much safety stock should be held?

$$SS = z\sigma_{dL}$$

$$SS = 1.88(5)$$

$$SS = 9.43$$

$$SS = 10\ tons$$

c. What reorder point should be used?

$$R = dL + z\sigma_{dL}$$

$$R = 50 + 10$$

$$R = 60\ tons$$

We order again when we're left with 60 tons of sand.

2. If only demand is variable, then $\sigma_{dL} = \sigma_d \sqrt{L}$

and the reorder point with safety stock is :

$$R = \bar{d} \times L + z\sigma_d \sqrt{L}$$

Where:

R = reorder point with safety stock

$\bar{d}$ =average daily or weekly demand

σ_d = standard deviation of demand per day or week

L = lead time in days or weeks

$\bar{d} = 50$

$\sigma_d = 3$

A restaurant uses an average of 50 jars of a special sauce each week. Weekly usage of sauce has a standard deviation of 3 jars. The manager is willing to accept no more than a 10 percent risk of stockout during lead time,

which is two weeks. Assume the distribution of usage is normal.

a. Which of the above formulas is appropriate for this situation? Why?

$$Formula\ 2, only\ the\ demand\ is\ variable?$$

b. Determine the value of z?

$$risk\ of\ stockout = 10\%$$
$$Service\ level\ = 90\%$$
$$z = 1.28$$

c. Determine the R?

$$R = \bar{d} * L + z\sigma_d L$$
$$R = 50 * 2 + 1.28 * 3 * \sqrt{2}$$
$$R = 100 + 6$$
$$R = 106\ jars$$