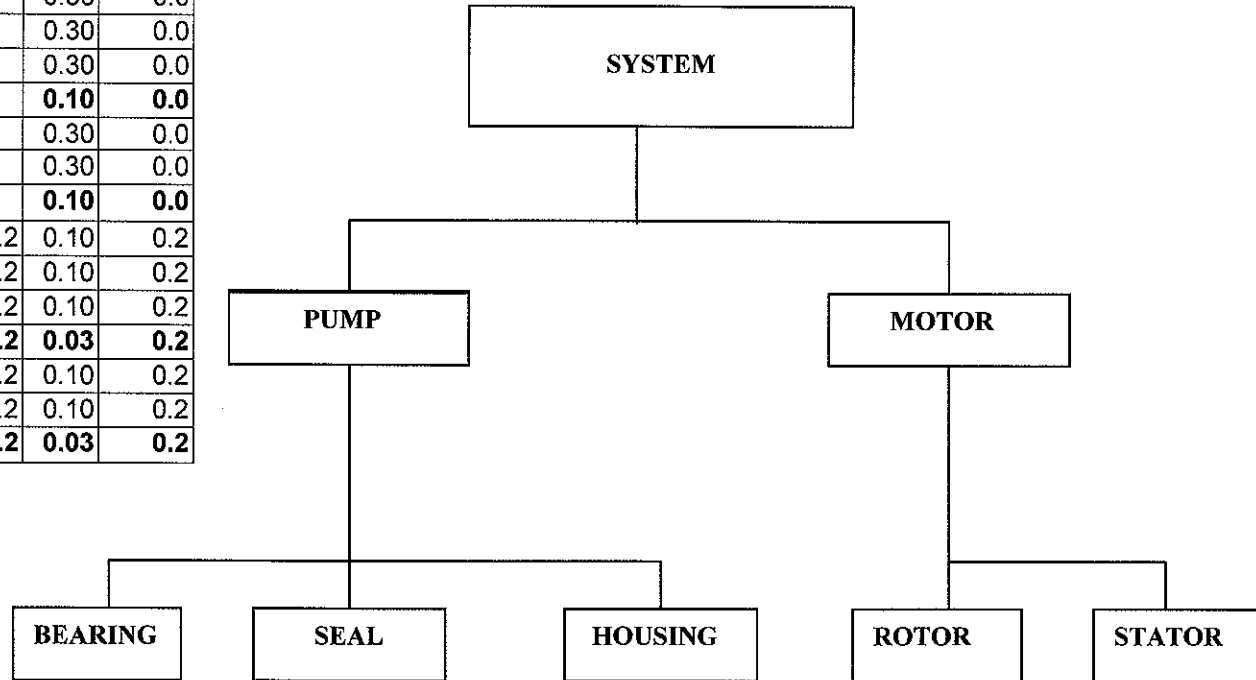
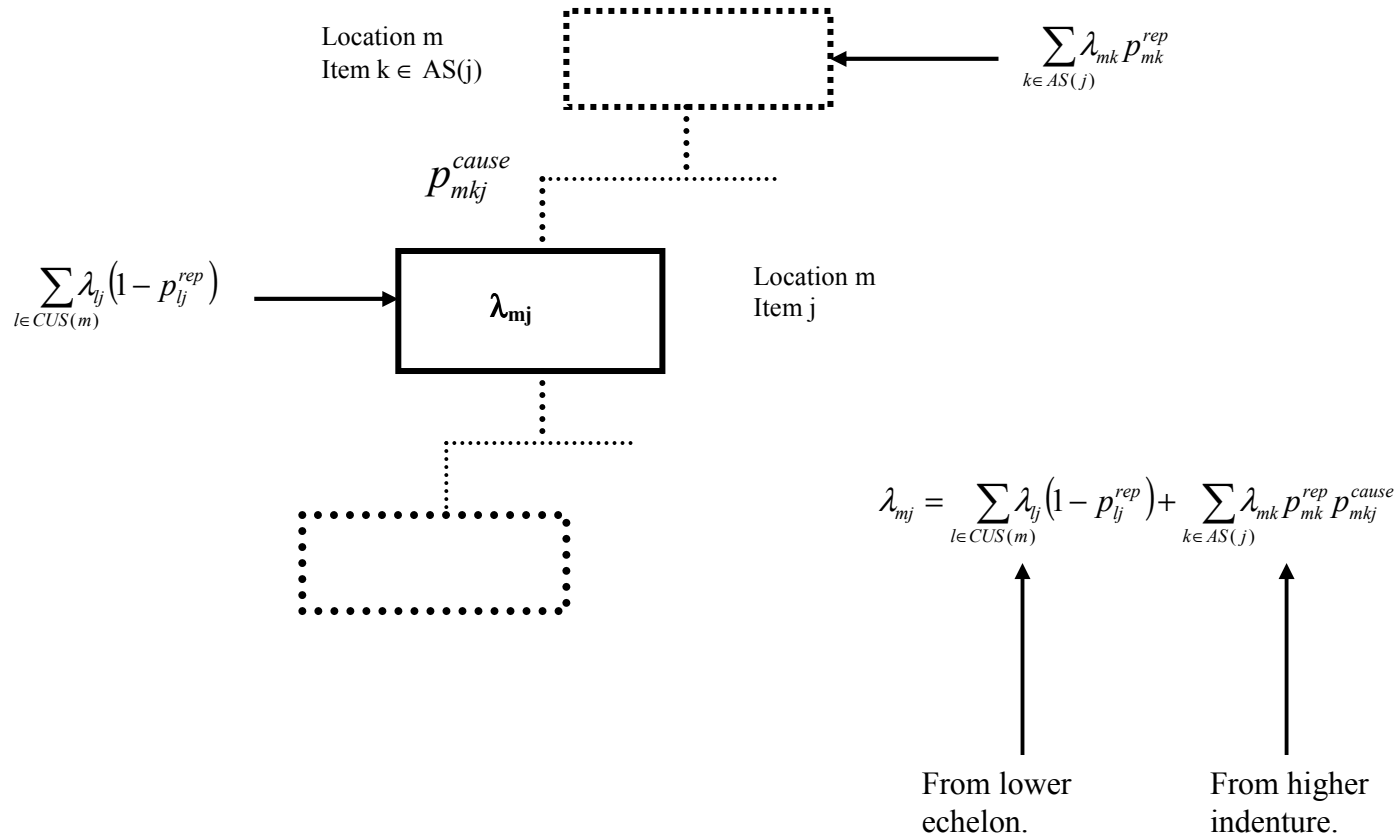


DESC	i	j	n	\$	Rijn	CAUSE	REP	RT	TAT
BEARING	1	1	0	3.30		0.32		0.30	0.0
SEAL	1	2	0	4.50		0.47		0.30	0.0
HOUSING	1	3	0	4.40		0.21		0.30	0.0
PUMP	1	0	0	19.80	19			0.10	0.0
ROTOR	2	1	0	1.50		0.29		0.30	0.0
STATOR	2	2	0	4.50		0.71		0.30	0.0
MOTOR	2	0	0	50.80	15			0.10	0.0
BEARING	1	1	1to5	3.30		0.32	0.2	0.10	0.2
SEAL	1	2	1to5	4.50		0.47	0.2	0.10	0.2
HOUSING	1	3	1to5	4.40		0.21	0.2	0.10	0.2
PUMP	1	0	1to5	19.80	19		0.2	0.03	0.2
ROTOR	2	1	1to5	1.50		0.29	0.2	0.10	0.2
STATOR	2	2	1to5	4.50		0.71	0.2	0.10	0.2
MOTOR	2	0	1to5	50.80	15		0.2	0.03	0.2



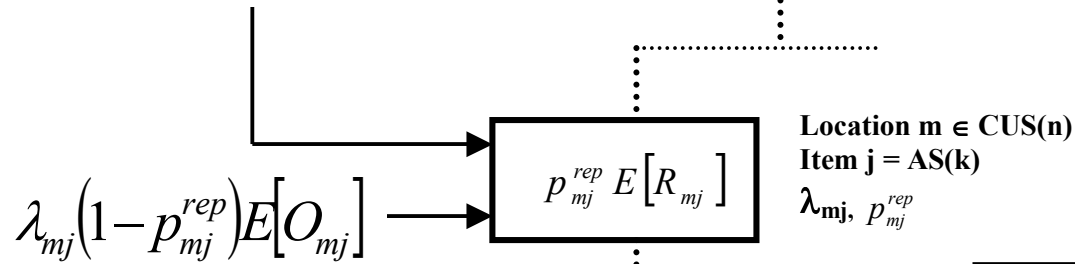


From item j, location n = SUP(m)

$$E[P_{SUP(m),j}] = \lambda_{mj} (1 - p_{mj}^{rep}) \frac{E[BO_{SUP(m),j}]}{\lambda_{SUP(m),j}}$$

Item j in repair at location m.

$$p_{mj}^{rep} E[R_{mj}] = \lambda_{mj} p_{mj}^{rep} E[ST_{mj}]$$



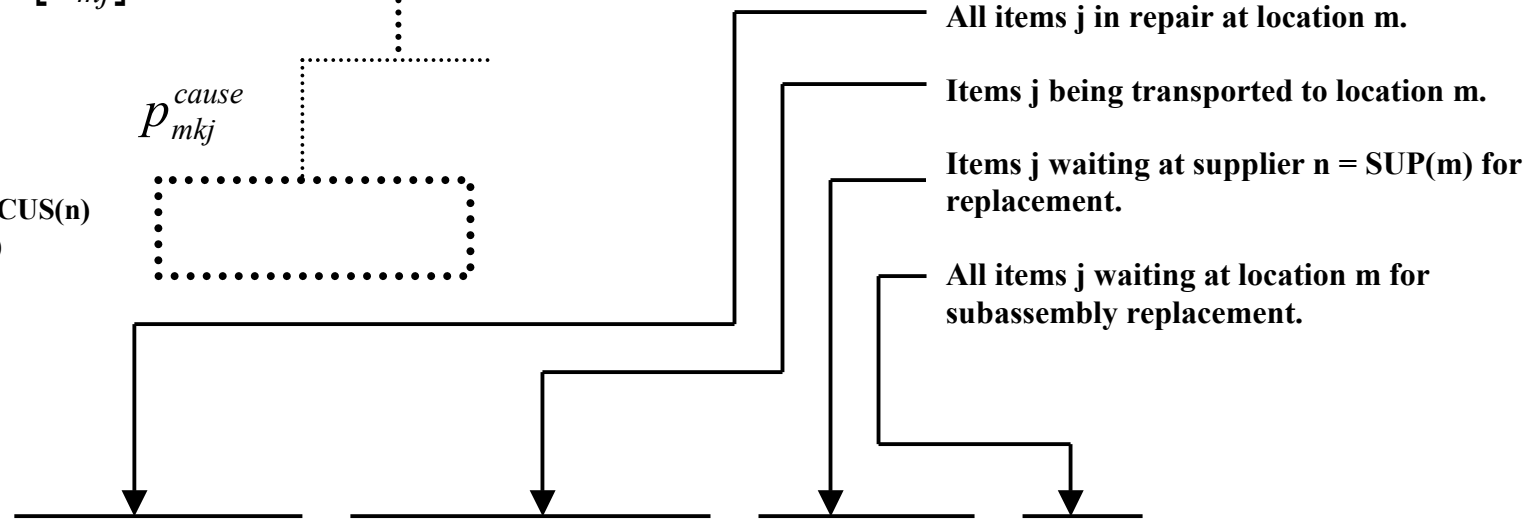
Subassemblies in repair.

$$E[P_{mk}] = \sum_{k \in SA(j)} p_{mj}^{rep} \lambda_{mj} p_{mkj}^{cause} \frac{E[BO_{mk}]}{\lambda_{mk}}$$

Item j, being transported.

Location m ∈ CUS(n)
Item k ∈ SA(j)
 $\lambda_{mk}, p_{mk}^{rep}$

p_{mkj}^{cause}



All items j in repair at location m.

Items j being transported to location m.

Items j waiting at supplier n = SUP(m) for replacement.

All items j waiting at location m for subassembly replacement.

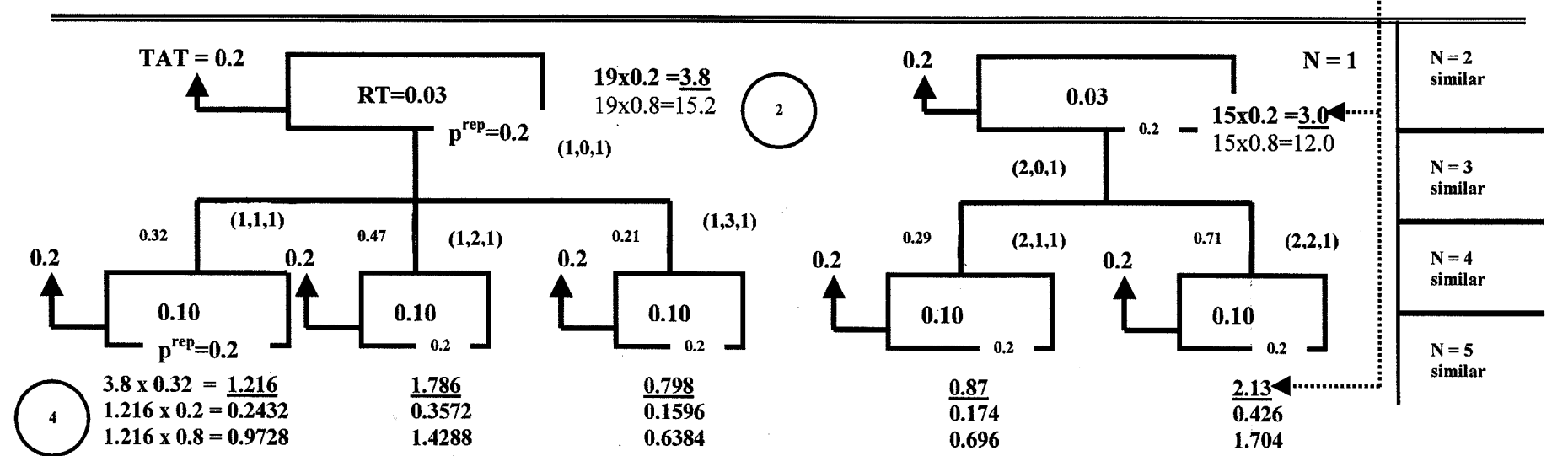
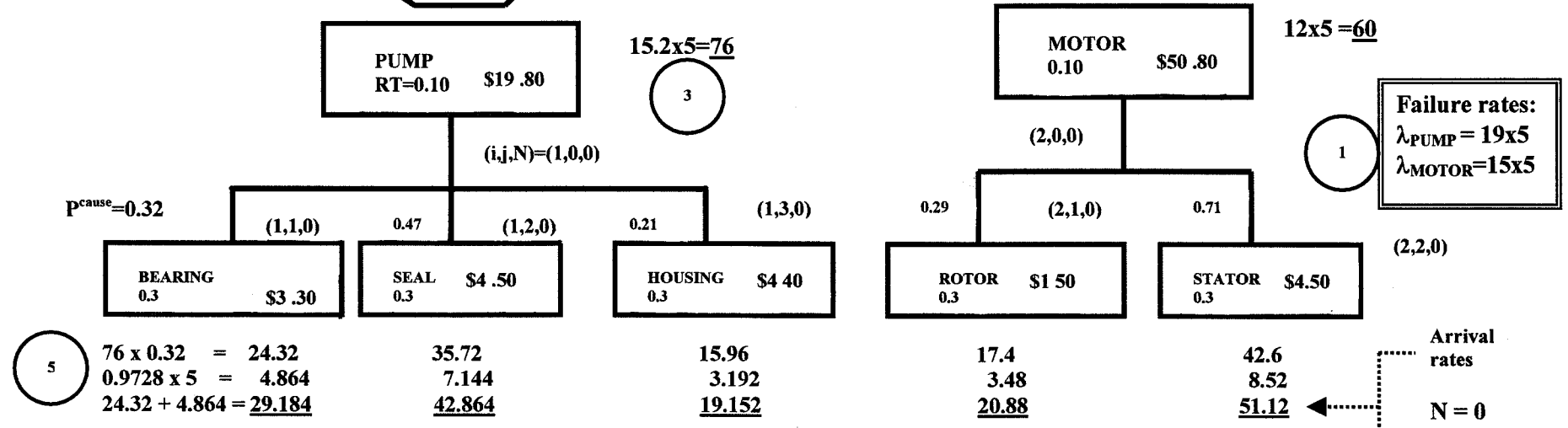
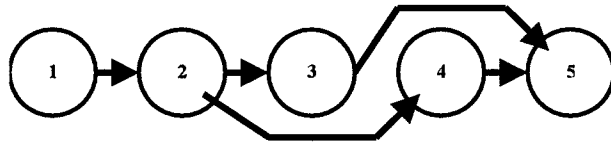
$$E[P_{mj}] = \lambda_{mj} p_{mj}^{rep} E[ST_{mj}] + \lambda_{mj} (1 - p_{mj}^{rep}) E[O_{mj}] + E[P_{SUP(m),j}] + E[P_{mk}]$$

Repair time

Transportation time

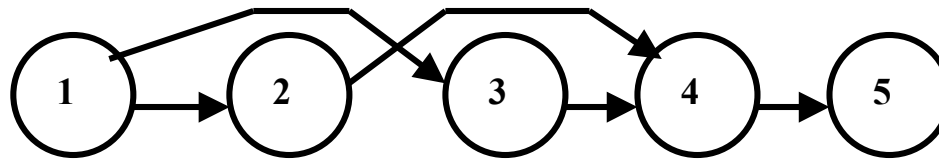
MOD-METRIC SCHEME

ARRIVAL RATES ALLOCATION



MOD-METRIC PL / EBO CALCULATION

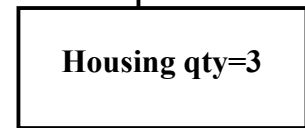
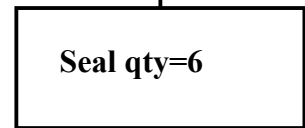
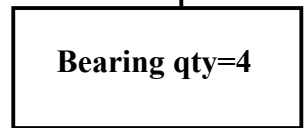
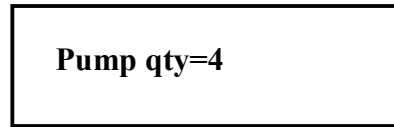
EBO CALCULATION



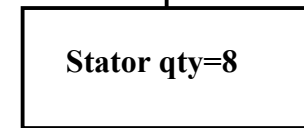
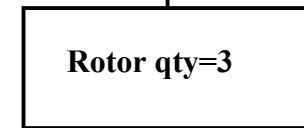
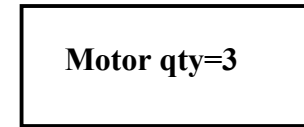
2

$$PL = 76 \times 0.1 + \frac{4.79}{29.184} 24.32 + \frac{6.877}{42.864} 35.72 + \frac{2.8447}{19.152} 15.96 = 19.69$$

EBO = 15.69



EBO = 11.91



MWT_k (Mean waiting time) = EBO_k / λ_k

[PL] = UNIT

$$PL = 60 \times 0.1 + \frac{3.331}{20.88} 17.4 + \frac{7.36}{51.12} 42.6 = 14.906$$

1

$$PL = 29.184 \times 0.3 = 8.7552$$

EBO = 4.79

$$PL = 42.864 \times 0.3 = 12.86$$

EBO = 6.877

$$PL = 19.152 \times 0.3 = 5.7456$$

EBO = 2.8447

$$PL = 20.88 \times 0.3 = 6.264$$

EBO = 3.331

$$PL = 51.12 \times 0.3 = 15.336$$

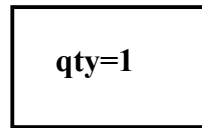
EBO = 7.36

N = 0

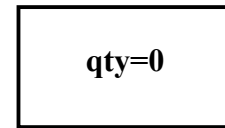
4

$$PL = 3.8 \times 0.03 + 15.2 \times 0.2 + \frac{15.69}{76} 15.2 + \frac{0.379}{1.216} 0.2432 + \frac{0.551}{1.786} 0.3572 + \frac{0.2385}{0.798} 0.1596 = 6.526$$

EBO = 5.5275



$$EBO_{base} = 5(5.5275 + 5.051) = 52.8925$$



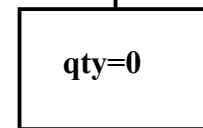
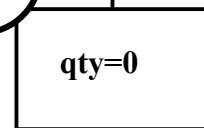
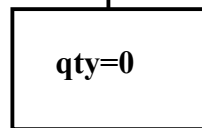
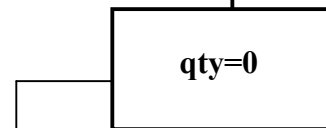
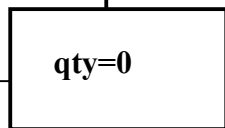
$$PL = 3 \times 0.03 + 12 \times 0.2 + \frac{11.91}{60} 12 + \frac{0.2676}{0.87} 0.174 + \frac{0.6287}{2.13} 0.426 = 5.051$$

EBO = 5.051

N = 1

N=2,3,4, 5 similar

5



$$PL = 0.426 \times 0.1 + 0.2 \times 1.704 + \frac{7.36}{51.12} 1.704 = 0.6287$$

EBO = 0.6287

3

$$PL = 0.03572 + 0.286 + 0.2292 = 0.551$$

EBO = 0.551

$$PL = 0.01596 + 0.1277 + 0.0948 = 0.2385$$

EBO = 0.2385

$$PL = 0.2432 \times 0.1 + 0.2 \times 0.9728 + \frac{4.79}{29.184} 0.9728 = 0.379$$

EBO = 0.379

$$PL = 0.174 \times 0.1 + 0.2 \times 0.696 + \frac{3.331}{20.88} 0.696 = 0.2676$$

EBO = 0.2676