

**LEAD 030610 Hypo 2 formulas.pdf, to be read in conjunction
with paper:
LEAD Lean Finance 032110 SDS redact.pdf**

.Control

Simulation Control Parameters

(002) FINAL TIME = 168
Units: Month

(003) INITIAL TIME = 0
Units: Month

(004) SAVEPER =
TIME STEP
Units: Month [0,?]

(005) TIME STEP = 1
Units: Month [0,?]

.Lead 030610 hypo 2

(007) "\$/hr" = 1
Units: dollar/hour

(008) adding = Depot FY NOR * NOR transfer
Units: dollar/Month

(009) adjusting = $((-1 * \text{adding} * \text{Test No Add}) / (\text{Depot direct gvt employees} * \text{Depot standard work hours})) + ((\text{Sine Test} * 0) + (\text{Input} * 0)) * \text{"$/hr"}$
Units: dollar/hour

(010) adjusting pulse = PULSE TRAIN(12, 1, 12, 168)
Units: 1/Month

(011) "AMC-adjusted Rates in FY n+2" = INTEG (approving + proposing - using, 100)
Units: dollar/hour

(012) applying = 1
Units: Dmnl

- (013) applying pulse= PULSE TRAIN(12, 1, 12, 168)
Units: 1/Month
- (014) approving= adjusting*adjusting pulse
Units: dollar/(Month*hour)
- (015) authorizing= (PBH Incidence+SBH Incidence+NBH Incidence+Surplus Hrs for New Business)* "Depot-applied Rates"
Units: dollar/Month
- (016) books closure= PULSE TRAIN(12, 1, 12, 168)
Units: 1/Month
- (017) Change in Pink Noise = (White Noise - Pink Noise)/Noise Correlation Time
Units: 1/Month
- (018) closing= Depot FY NOR*books closure
Units: dollar/Month
- (019) completing= (PBH Incidence+SBH Incidence+NBH Incidence)*(1-Lean savings pct)
Units: hour/Month
- (020) contracting= PBH Incidence+SBH Incidence+NBH Incidence
Units: hour/Month
- (021) Customer Order Rate = Initial Customer Order Rate*Input
Units: Widgets/Week
- (022) DDGE((0,0)-(200,1000)],(0,697),(168,697))
Units: employee
- (023) Depot Annual Dollars= "Pres. Budget Dollars"+Supps' Budget Dollars+New Business Dollars
Units: dollar/year
- (024) Depot AOR= INTEG (adding-giving back,0)
Units: dollar
- (025) Depot direct gvt employees= LOOKUP BACKWARD(DDGE, Time)
Units: employee
- (026) Depot FY Labor Hours Authority= INTEG ("W-4 ing"-expending,0)
Units: hour

- (027) Depot FY Labor Hours Capacity= INTEG (+contracting-completing-YE zeroing capacity,0)
Units: hour
- (028) Depot FY NOR= INTEG (authorizing-closing-expensing, 0)
Units: dollar
- (029) Depot gvt employees= LOOKUP BACKWARD(DGE, Time)
Units: employee
- (030) Depot standard work hours= LOOKUP BACKWARD(DSWHrs, Time)
Units: hour/(employee*Month)
- (031) "Depot-applied Rates"= 100
Units: dollar/hour
- (032) "Depot-applied Rates in FY n+3"= INTEG (+using-replacing,100)
Units: dollar/hour
- (033) "Depot-proposed Rates in FY n+1"= INTEG (projecting-proposing,100)
Units: dollar/hour
- (034) DGE([(0,0)-(200,2000)],(0,1227),(168,1227))
Units: employee
- (035) DSWHrs((0,0)-(200,2000)],(0,1615),(168,1615))
Units: hour/(Month*employee)
- (036) emerging=expending-completing
Units: hour/Month
- (037) expending=PBH Incidence+SBH Incidence+NBH Incidence
Units: hour/Month
- (038) expensing="Depot-applied Rates"*(PBH Incidence+((SBH Incidence+NBH Incidence+Surplus Hrs for New Business)*(1-Overhead Ratio)))
Units: dollar/Month
- (039) FY Aggregate Surplus Hours= INTEG (+emerging-YE zeroing surplus,0)
Units: hour
- (040) FY Emerging Surplus Hrs for Customers= ACTIVE INITIAL (emerging*(1-Surplus Hours Retention Pct),0)
Units: hour/Month

- (041) FY Projected Surplus Hours= SIMULTANEOUS (FY Aggregate Surplus Hours+(emerging*("Remaining FY months @ month begin"-1))*LRE approach,0)
Units: hour
- (042) giving back=Depot AOR*("Test (giving back)" +giving back pulse)
Units: dollar/Month
- (043) giving back pulse=PULSE TRAIN(13, 1, 12, 168)
Units: Dmnl/Month
- (044) Initial Customer Order Rate = 0
Units: Widgets/Week
- (045) Input=
0+STEP(Step Height,Step Time)+
(Pulse Quantity/TIME STEP)*PULSE(Pulse Time,TIME STEP)+
RAMP(Ramp Slope,Ramp Start Time,Ramp End Time)+
Sine Amplitude*SIN(2*3.14159*Time/Sine Period)+
STEP(1,Noise Start Time)*Pink Noise
Units: Dimensionless
- (046) labor rate escalator=LOOKUP BACKWARD(LLRE, Time)
Units: Dmnl
- (047) Lean savings pct=0.1
Units: Dmnl
- (048) LLRE([(0,0)-(200,10)],(0,1.016),(168,1.016))
Units: Dmnl
- (049) LRE approach=RAMP(0.0825,1,12)
Units: Dmnl
- (050) LST([(0,-20)-(200,20)],(0,0),(11,20),(23,0),(35,-20),(47,0),(59,20),(71,0),(83,-20),(95,0),(107,20),(119,0))
Units: Dmnl
- (051) Max NOR Bonus=closing/Depot gvt employees
Units: dollar/(employee*Month)
- (052) Monthly direct hours=Depot direct gvt employees*Depot standard work hours
Units: hour/Month
- (053) NBH([(0,0)-(200,2e+006)],(0,0),(36,0),(48,55556),(60,111111),(72,166667),(108,166667),(120,111111),(132,55556),(144,0),(168,0))
Units: hour/year

- (054) NBH Incidence="New Business Hrs."*NBH Pulse
Units: hour/Month
- (055) NBH Pulse=PULSE TRAIN(0,1,1, 168)
Units: year/Month
- (056) NBH switch=1
Units: Dmnl
- (057) New Business Dollars="New Business Hrs."*"Depot-applied Rates"
Units: dollar/year
- (058) "New Business Hrs."= ACTIVE INITIAL (LOOKUP BACKWARD(NBH, Time)*NBH switch,165000)
Units: hour/year
- (059) Noise Correlation Time=12
Units: Month
- (060) Noise Standard Deviation = 0
Units: Dimensionless
- (061) Noise Start Time = 5
Units: Month
- (062) NOR transfer=PULSE TRAIN(12, 1, 12, 168)
Units: 1/Month
- (063) Overhead Load=1-(Depot direct gvt employees/(Depot gvt employees+0.1))
Units: Dmnl
- (064) Overhead Ratio=0.44
Units: Dmnl
- (065) Overhead Switch=0
Units: Dmnl
- (066) PBH([(0,0)-(200,2e+006)],(0,200000),(120,200000))
Units: hour/year
- (067) PBH Incidence="Pres. Budget Hrs."*PBH Pulse
Units: hour/Month
- (068) PBH Pulse=PULSE TRAIN(0, 1, 1, 168)
Units: year/Month

- (069) PBH switch=0
Units: Dmnl
- (070) Pct of Surplus Hours to Current Customers=0.5
Units: Dmnl
- (071) Pink Noise = INTEG(Change in Pink Noise,0)
Units: Dimensionless
- (072) "Pres. Budget Dollars"="Pres. Budget Hrs."*"Depot-applied Rates"
Units: dollar/year
- (073) "Pres. Budget Hrs."= ACTIVE INITIAL (LOOKUP BACKWARD(PBH, Time)*PBH switch,200000)
Units: hour/year
- (074) projecting=POWER(labor rate escalator, 3)*"Depot-proposed Rates in FY n+1"*projecting pulse
Units: dollar/(hour*Month)
- (075) projecting pulse=PULSE TRAIN(12, 1, 12, 168)
Units: 1/Month
- (076) proposing="Depot-proposed Rates in FY n+1"*adjusting pulse
Units: dollar/(Month*hour)
- (077) Pulse Quantity=0
Units: Dimensionless*Month
- (078) Pulse Time=12
Units: Month
- (079) Ramp End Time=1e+009
Units: Month
- (080) Ramp Slope=0
Units: 1/Month
- (081) Ramp Start Time=5
Units: Month
- (082) Rates Variance=("Depot-applied Rates in FY n+3"-"Depot-proposed Rates in FY n+1")/"Depot-proposed Rates in FY n+1"
Units: Dimensionless

- (083) "Remaining FY months @ month begin"=12-MODULO(Time-1,12)
Units: Month
- (084) replacing=PULSE TRAIN(12, 1, 12, 168)*"Depot-applied Rates in FY n+3"/"yr-to-mo pulse"
Units: dollar/(Month*hour)
- (085) SBH([(0,0)-200,2e+006]),(0,0),(36,0),(48,116667),(60,233333),(72,350000),(108,350000),(120,233333),(132,116667),(144,0),(168,0))
Units: hour/year
- (086) SBH Incidence="Supps' Budget Hrs."*SBH Pulse
Units: hour/Month
- (087) SBH Pulse=PULSE TRAIN(8, 4, 12, 168)
Units: year/Month
- (088) SBH switch=0
Units: Dmnl
- (089) Sine Amplitude=0
Units: Dimensionless
- (090) Sine Period=12
Units: Month
- (091) Sine Test=LOOKUP BACKWARD(LST, Time)*0
Units: Dmnl
- (092) Step Height=0
Units: Dimensionless
- (093) Step Time=5
Units: Month
- (094) Supps' Budget Dollars="Supps' Budget Hrs."*"Depot-applied Rates"
Units: dollar/year
- (095) "Supps' Budget Hrs."= ACTIVE INITIAL (LOOKUP BACKWARD(SBH, Time)*SBH switch,0)
Units: hour/year
- (096) Surplus Hours Retention Pct=0.4
Units: Dmnl

(097) Surplus Hrs for Current Customers=FY Emerging Surplus Hrs for Customers*Pct of Surplus Hours to Current Customers

Units: hour/Month

(098) Surplus Hrs for New Business=FY Emerging Surplus Hrs for Customers*(1-Pct of Surplus Hours to Current Customers)

Units: hour/Month

(099) "Test (giving back)"=0

Units: Dmnl/Month

(100) Test No Add=1

Units: Dmnl

(101) using="AMC-adjusted Rates in FY n+2"*applying*applying pulse

Units: dollar/(Month*hour)

(102) "W-4 ing"=PBH Incidence+SBH Incidence+NBH Incidence

Units: hour/Month

(103) White Noise = Noise Standard Deviation*((24*Noise Correlation Time/TIME STEP)^0.5*(RANDOM 0 1() - 0.5))

Units: Dimensionless

(104) YE zeroing capacity=PULSE TRAIN(12, 1, 12, 168)*Depot FY Labor Hours Capacity/"yr-to-mo pulse"

Units: hour/Month

(105) YE zeroing surplus=PULSE TRAIN(12, 1, 12, 168)*((FY Aggregate Surplus Hours/"yr-to-mo pulse"))

Units: hour/Month

(106) "yr-to-mo pulse"=1

Units: Month