

Construction Gaming

Gaming Programming Process

401.661 Advanced Construction Technology

Nov. 21, 2006

Moonseo Park

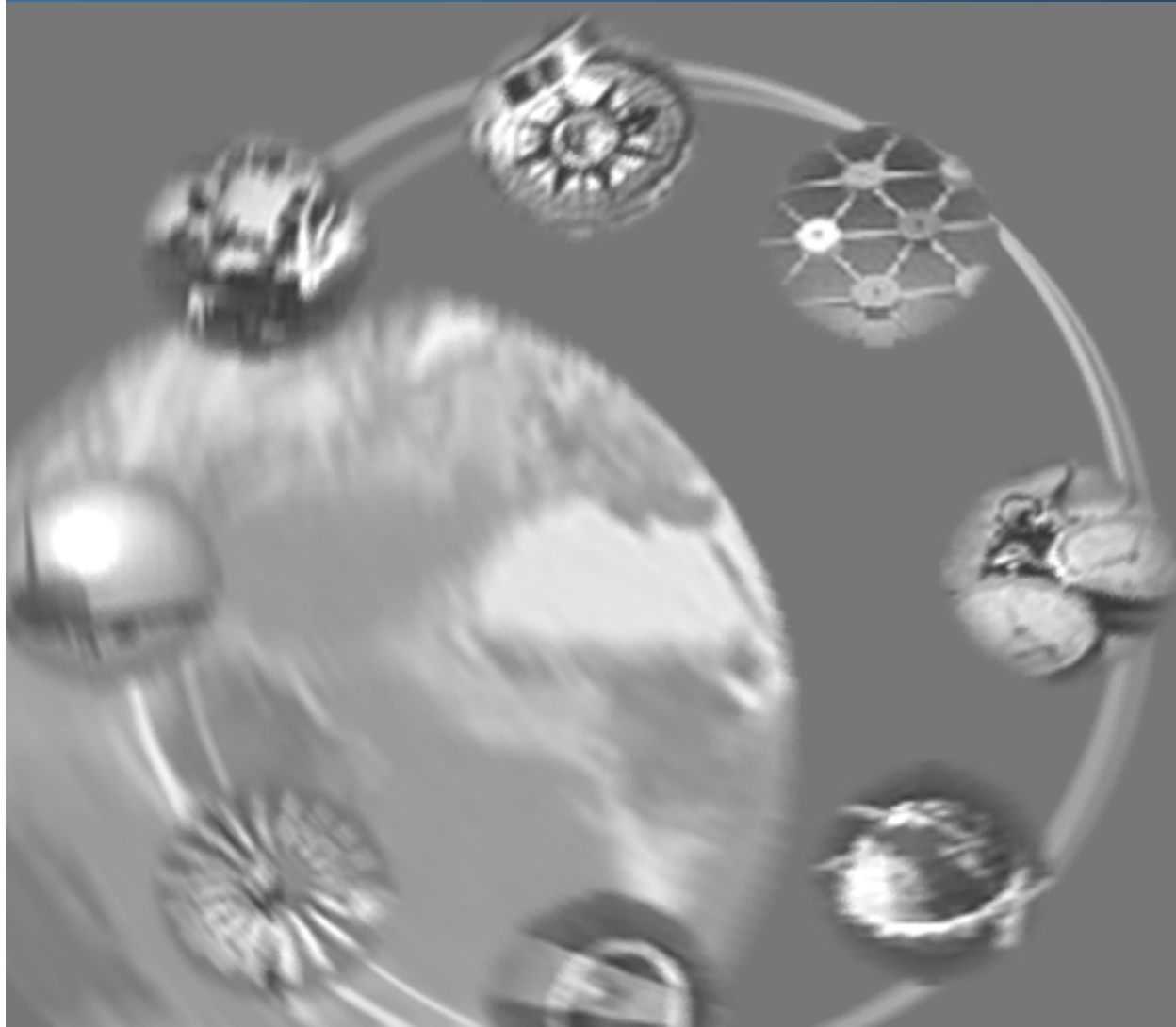
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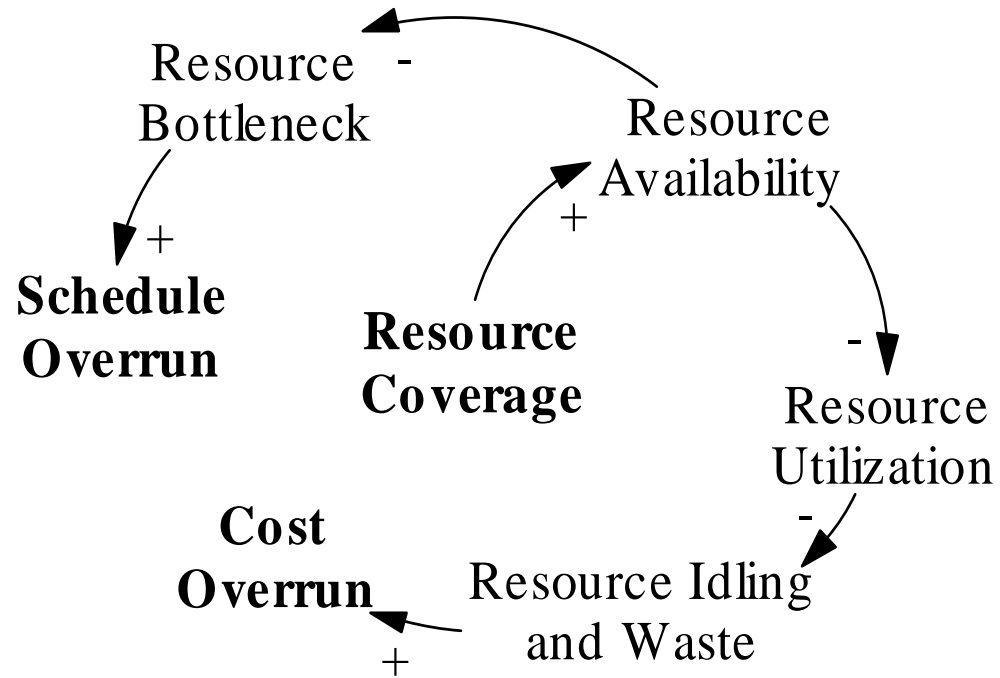


서울대학교
건설기술연구실

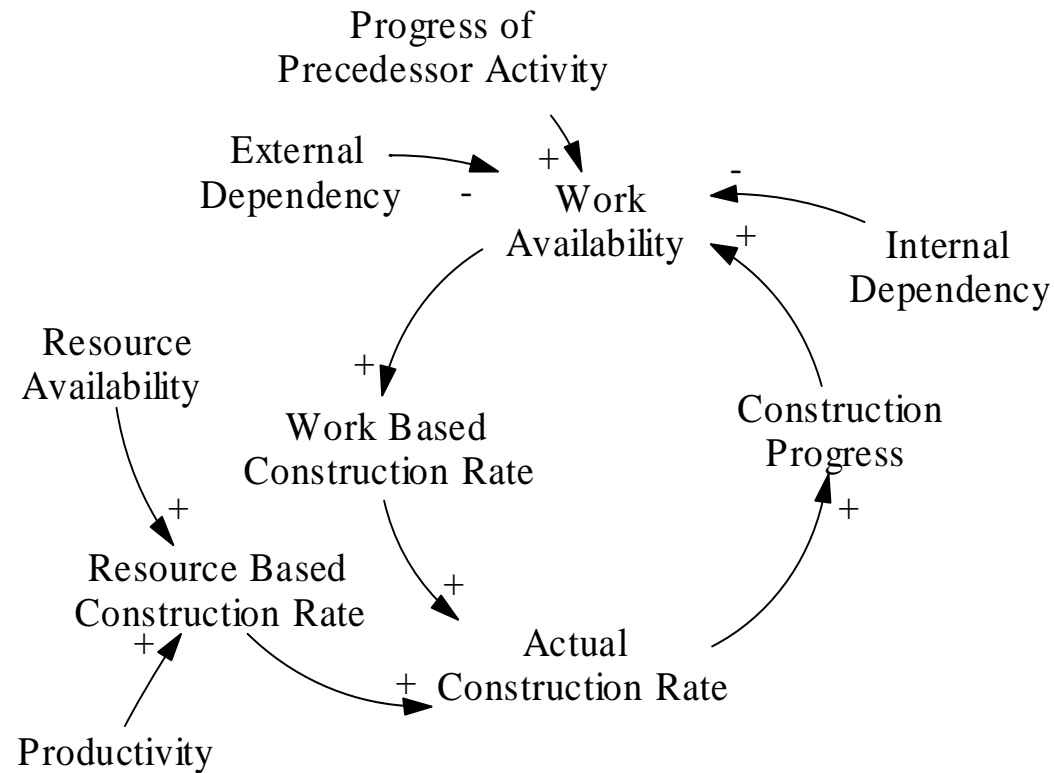


Tradeoff

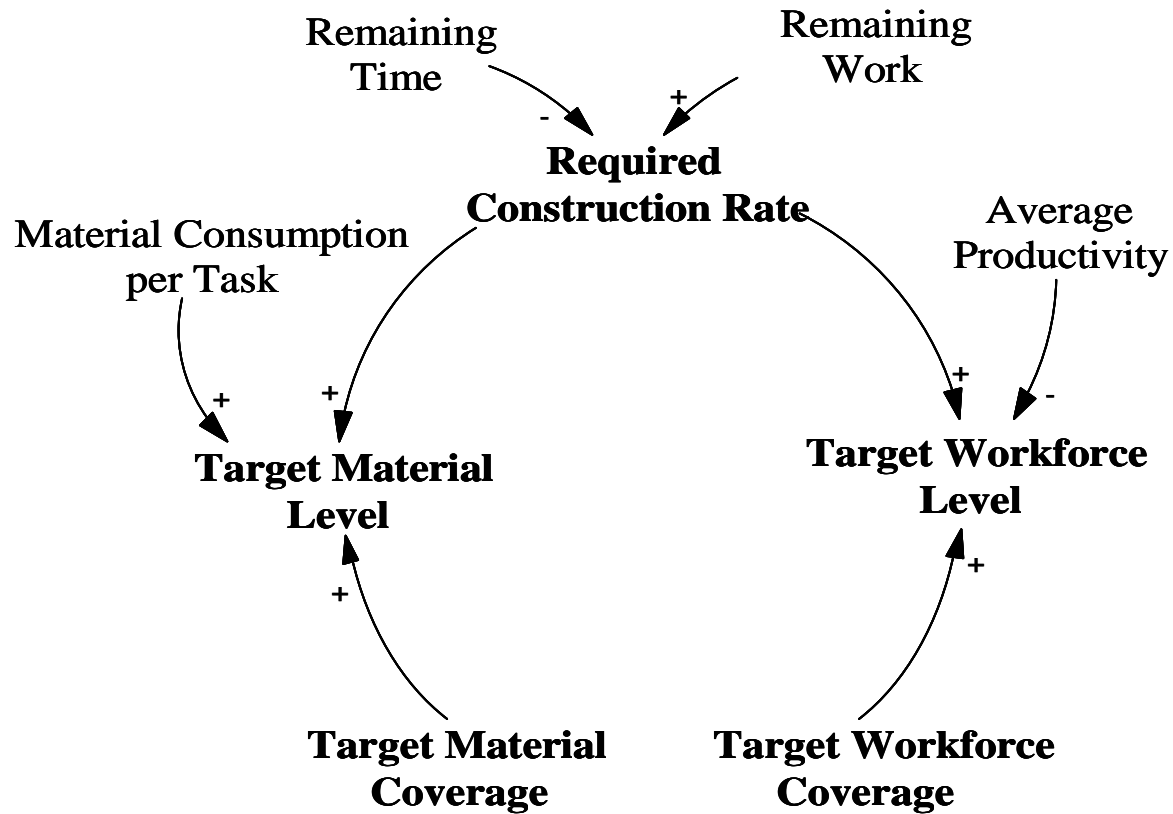
Resource Coverage vs Project Performance



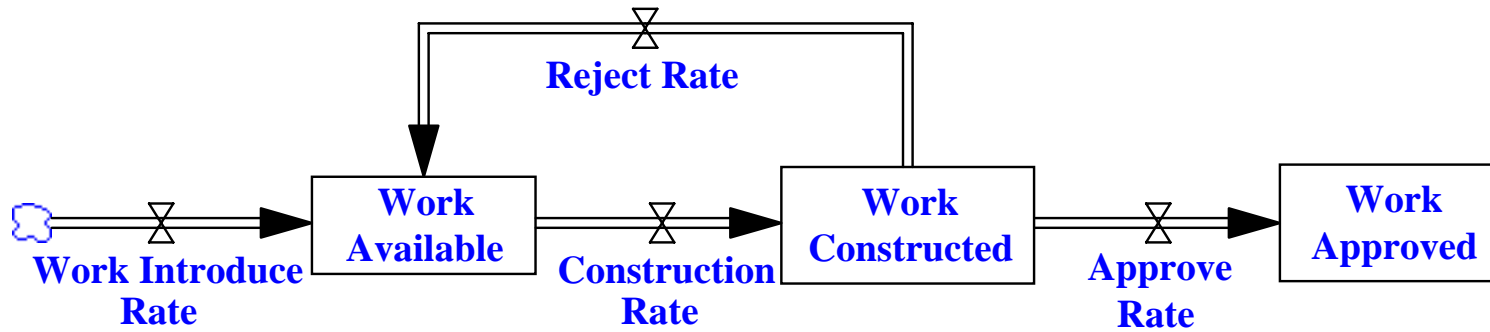
Construction Progress Determinants



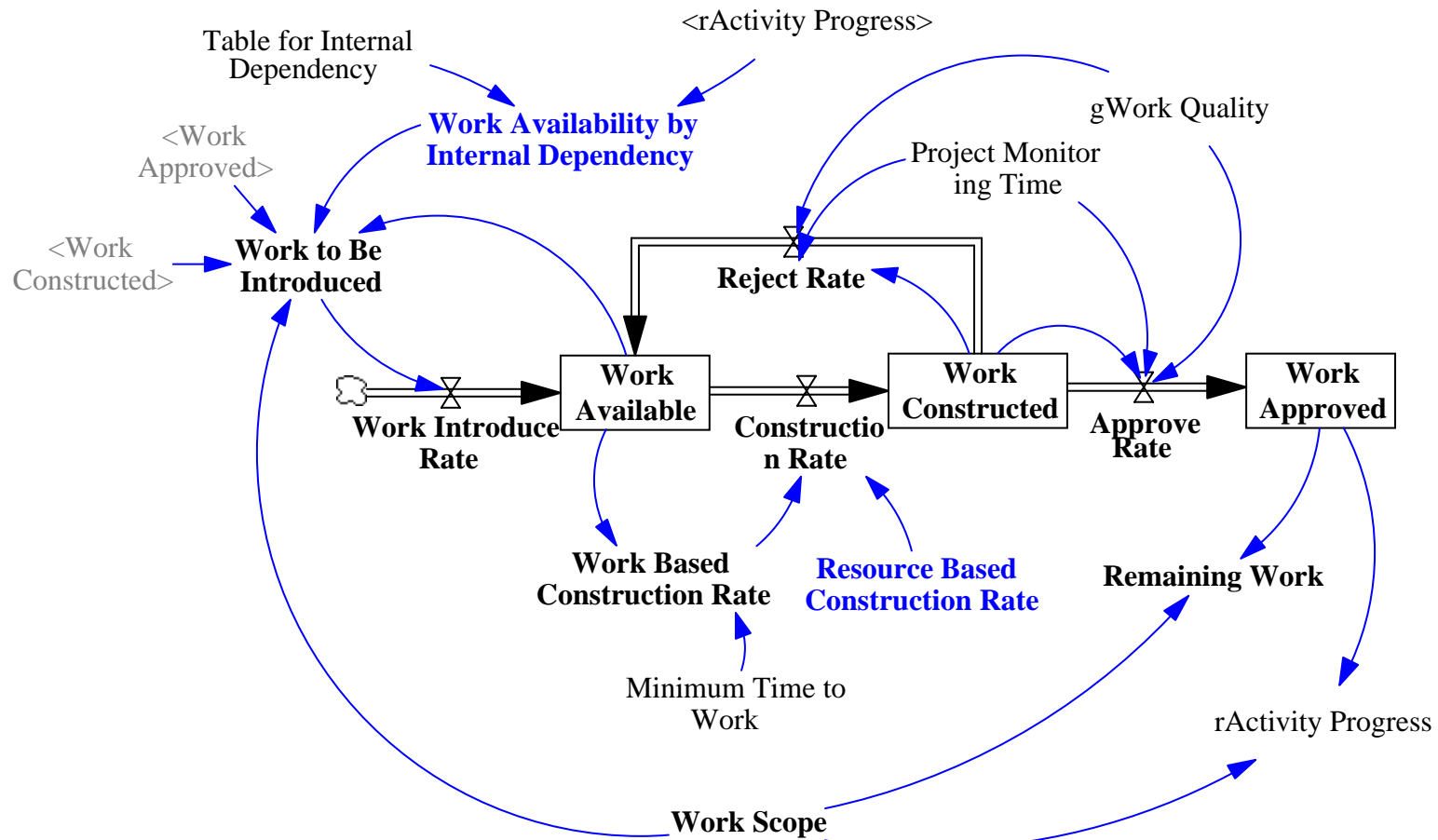
Resource Level Targeting



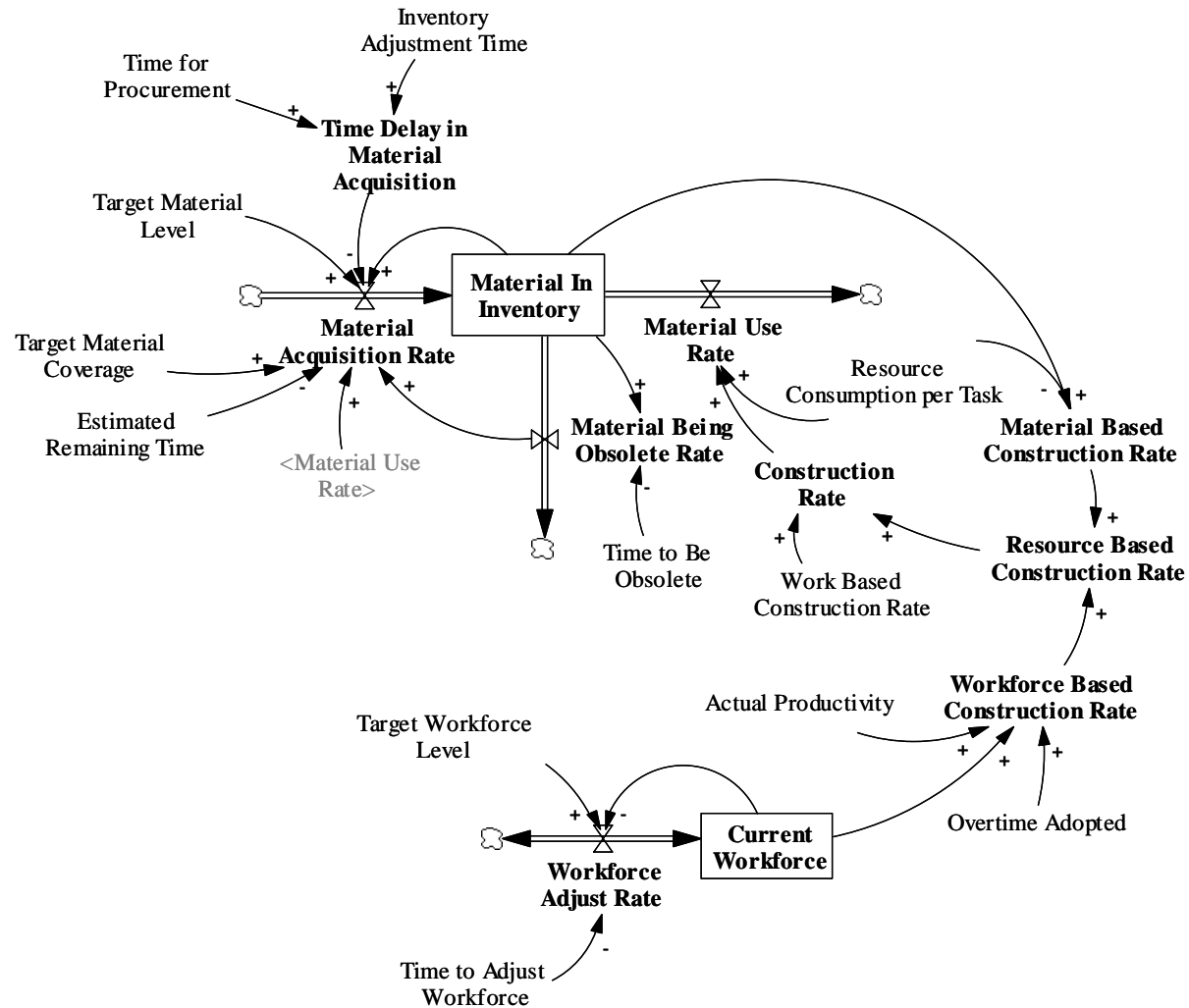
S&F for Work Process



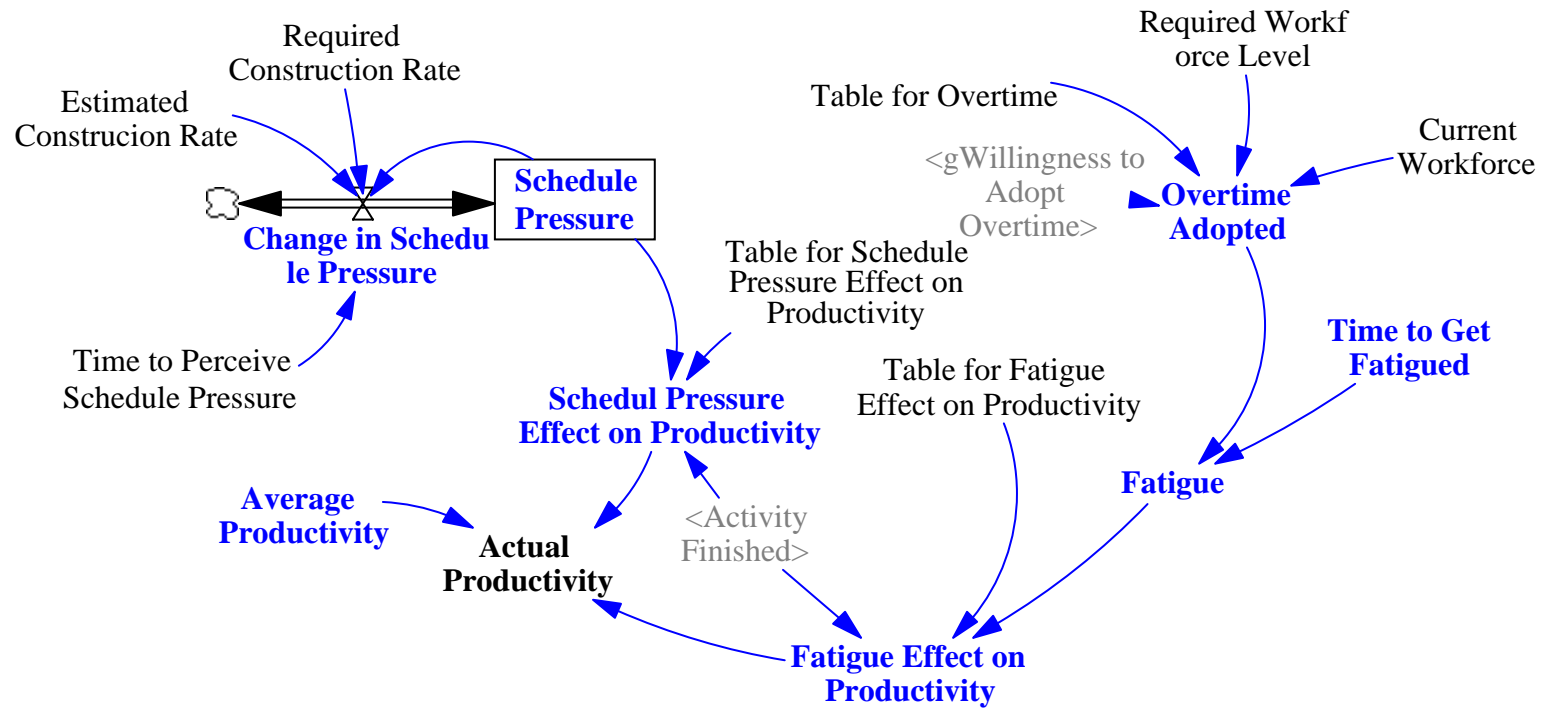
Work Flow Determinants



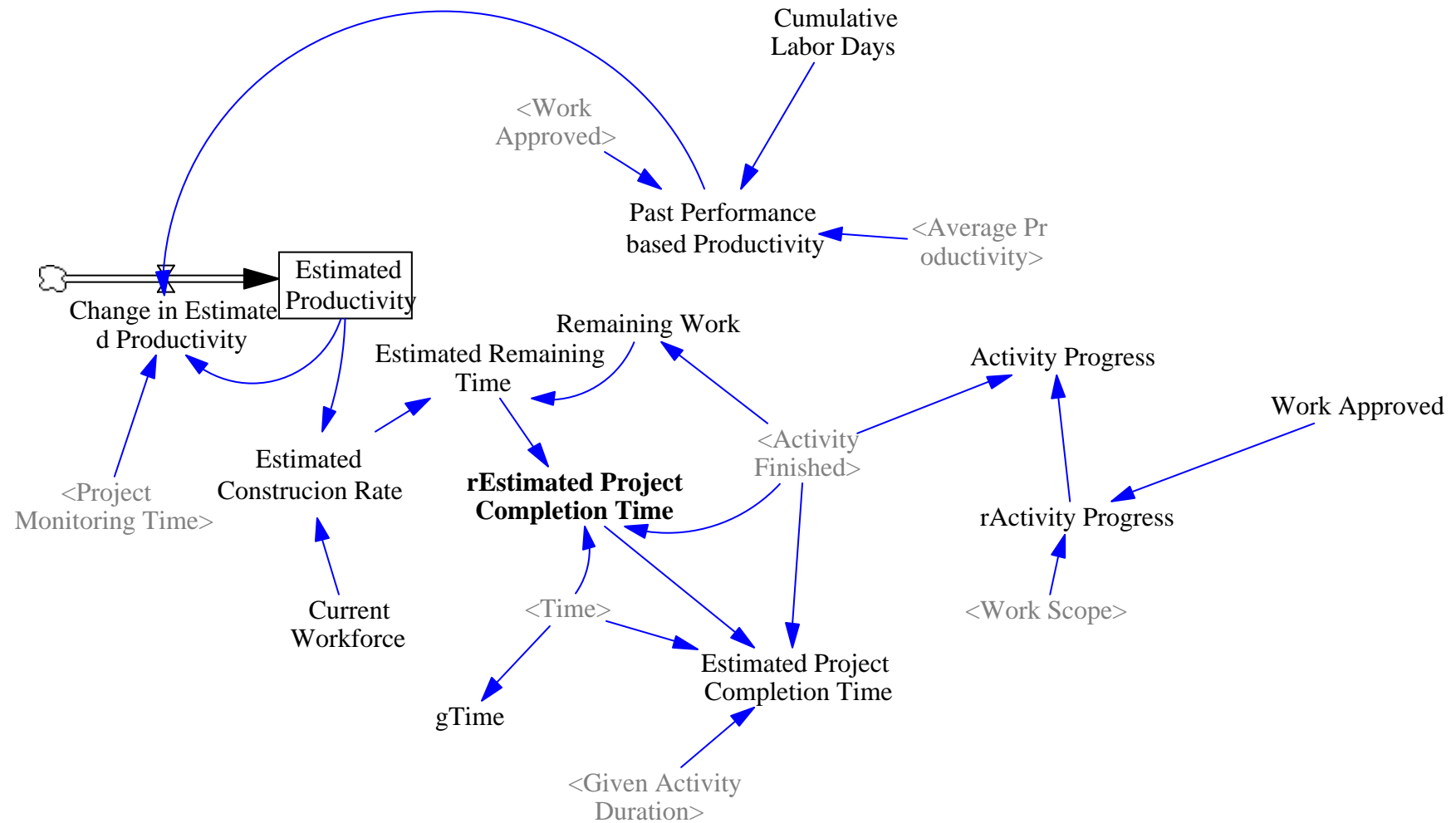
Resource Based Construction Rate



Productivity



Finishing Time Estimation

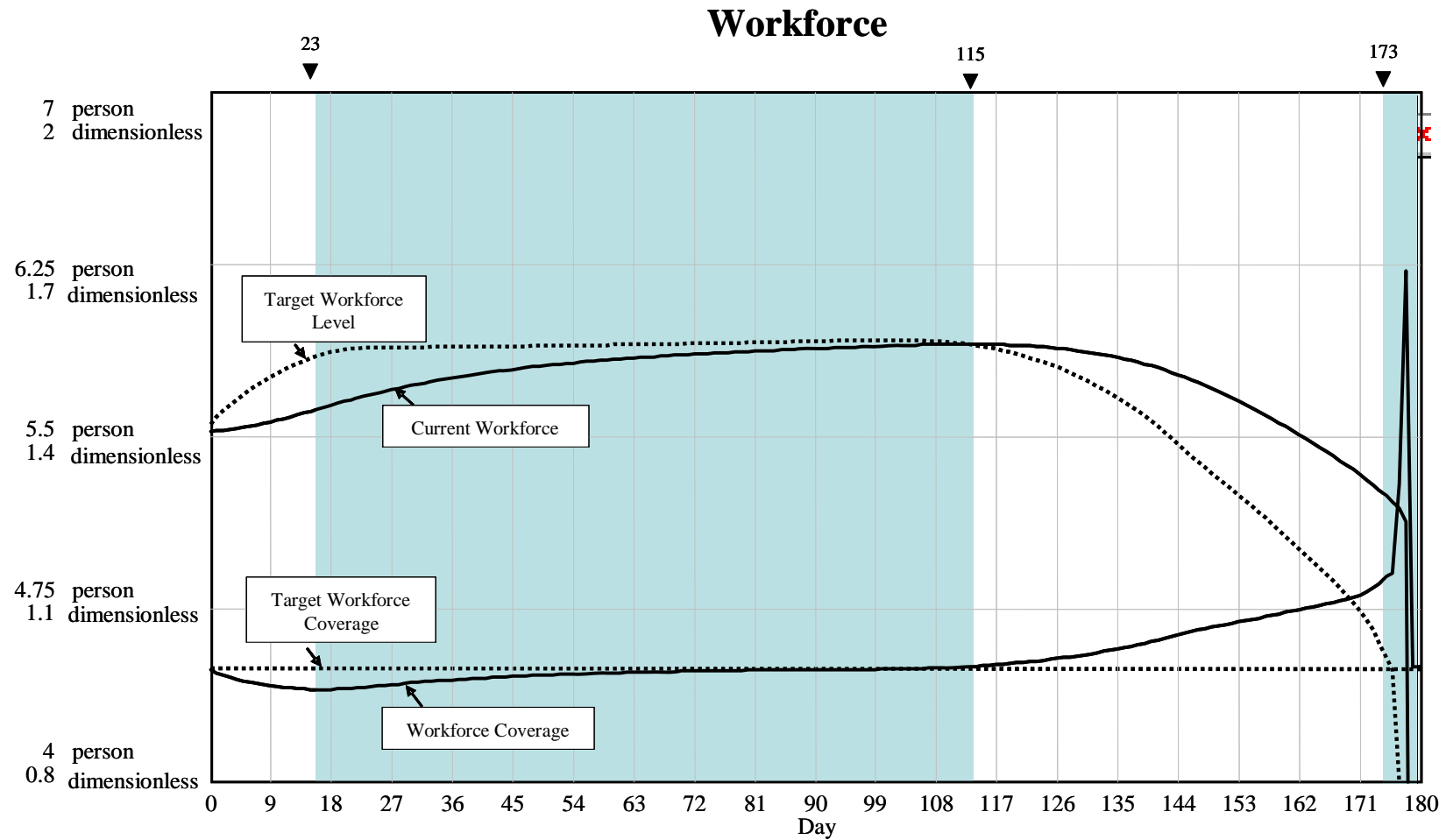


Model Setting

Model Parameter		Value	Unit
Category	Variable Name		
Activity	Planned Activity Duration	180	Day
	Work Scope	10,000	Task
	Minimum Time to Work	1	Day
Productivity	Average Productivity	10	Task/(Day*Person)
Quality	Initially Expected Work Quality	95%	Dimensionless
Cost	Resource Consumption per Task	100	Resource Unit/Task
	Cost per Worker per Day	100	\$/Person/Day
	Average Project Monitoring Time	7	Day
	Material Cost per RU	100	\$/Task
Management	Willingness to Adopt Overtime	1*	Dimensionless
	Time for Procurement	10	Day
	Time to Adjust Workforce	28	Day
	Budget Contingency	5%	Dimensionless
Others	Time to Be Obsolete	90	Day
	Time to Get Fatigued	14	Day

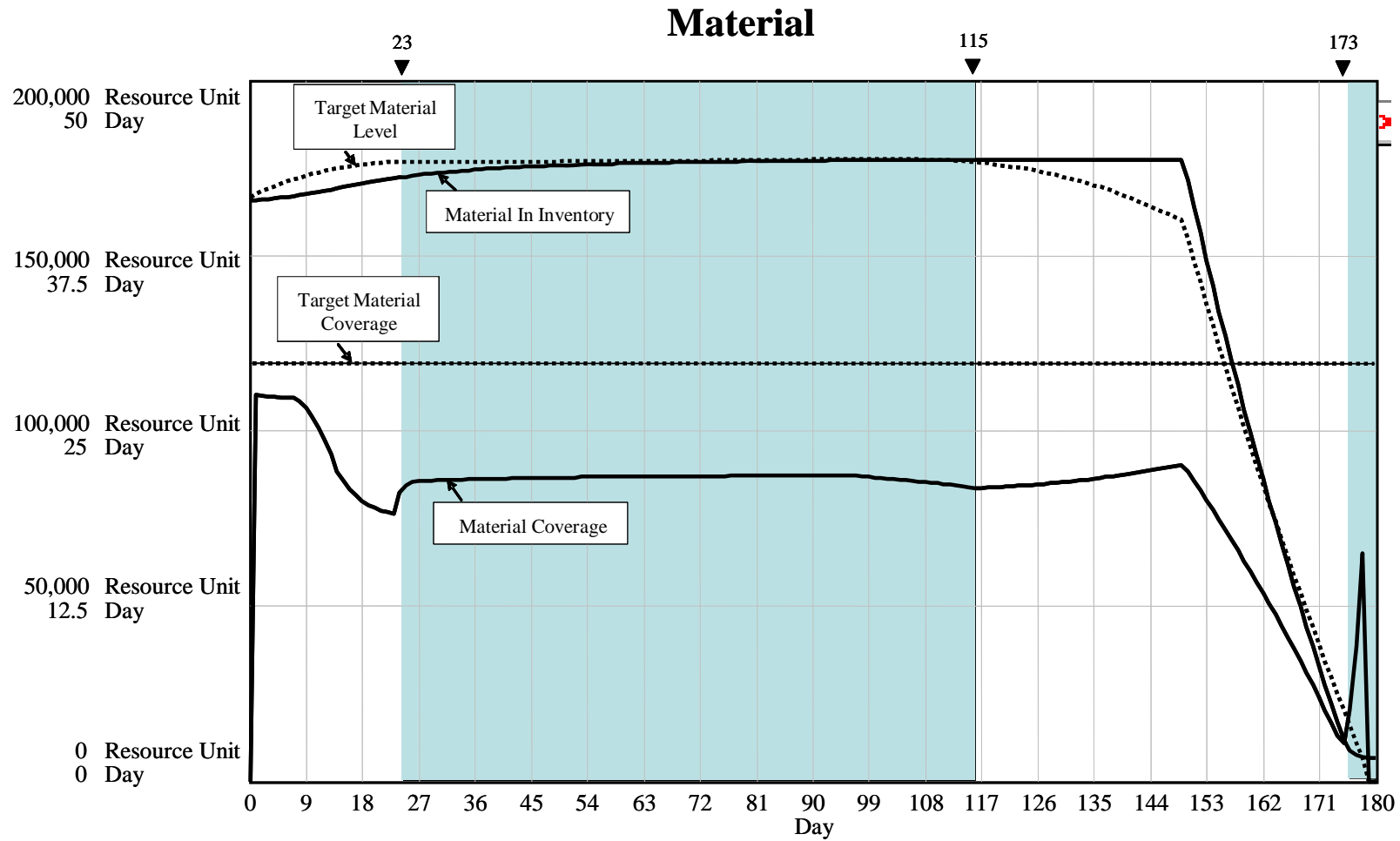
Model Parameter		Value	Unit	Reference
Category	Variable Name			
Resource Management Policy	Target Material Coverage	4.5	Day	300 (day) / 33 (storey) / 2, assuming: 1) the same amount of brick work done for all floors, 2) bricks procured for the next floor work
	Target Workforce Coverage	1.25	Dimensionless	As multiplier of the required number of workers
Activity	Planned Activity Duration	300	Day	
	Work Scope	29,800	M ²	
	Minimum Time to Work	1	Day	
Productivity	Average Productivity	15	M ² /(Day*Person)	10 to 20 M ² depending on work area
Quality	Initially Expected Work Quality	95%	Dimensionless	
Cost	Resource Consumption per Task	55	Brick/ M ²	
	Cost per Worker per Day	90	\$\$/Person/Day	150% of weight applied for overtime
	Average Project Monitoring Time	7	Day	Based on inspection schedule by the main contractor
	Material Cost per RU	0.185	\$\$/Brick	Including material cost for joint
Management	Willingness to Adopt Overtime	1	Dimensionless	As multiplier of the required overtime
	Time for Procurement	3	Day	
	Time to Adjust Workforce	7	Day	
	Budget Contingency	5%	Dimensionless	
Work Dependency	External Dependency	0 to 1	Dimensionless	In proportion to the predecessor activity (building skeleton construction) progress
	Internal Dependency	0 to 1	Dimensionless	In proportion to the activity progress
Others	Time to Be Obsolete	90	Day	
	Time to Get Fatigued	14	Day	

Adjusting Workforce



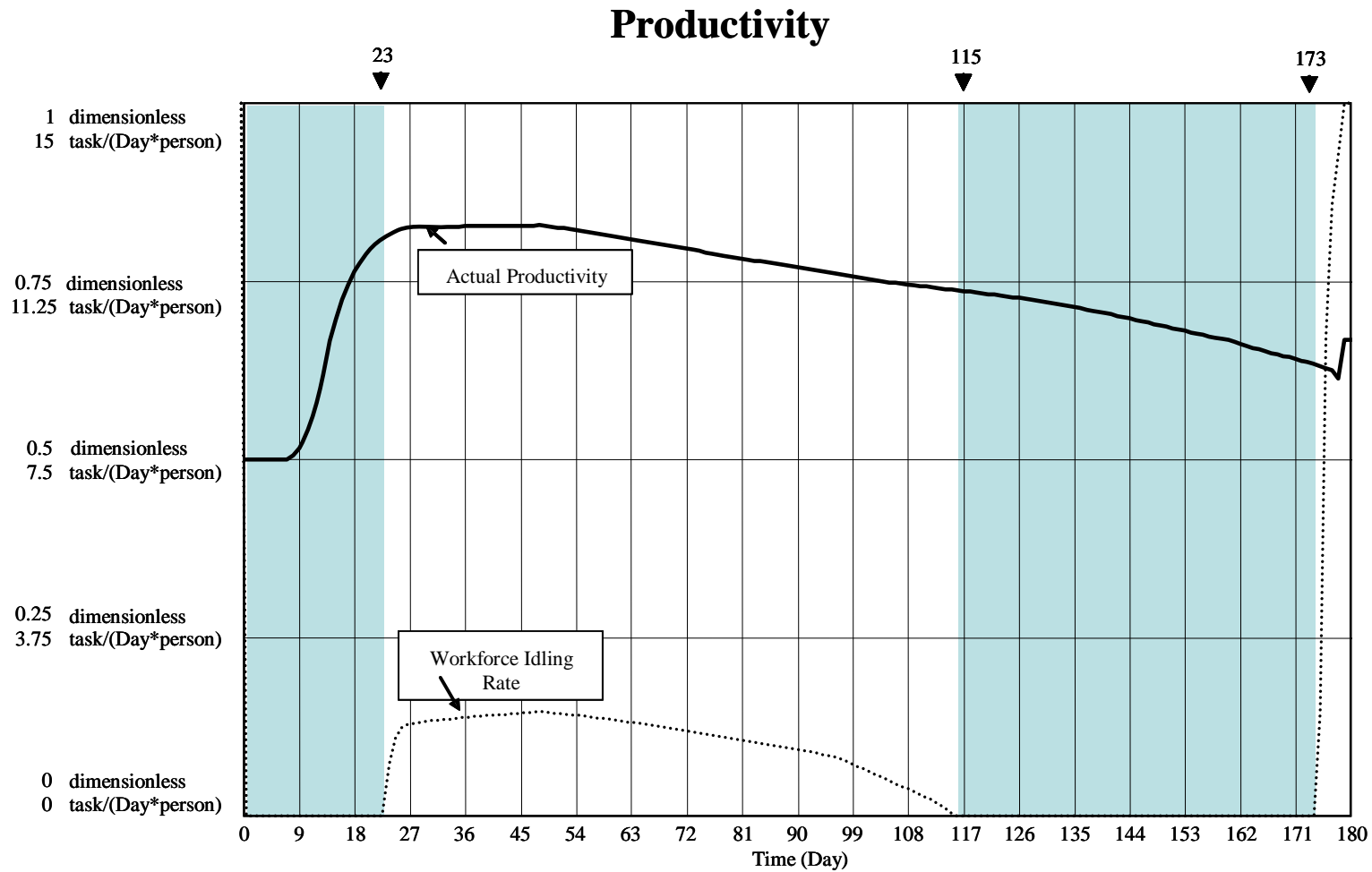
Work-Constraint Period

Adjusting Material



Work-Constraint Period

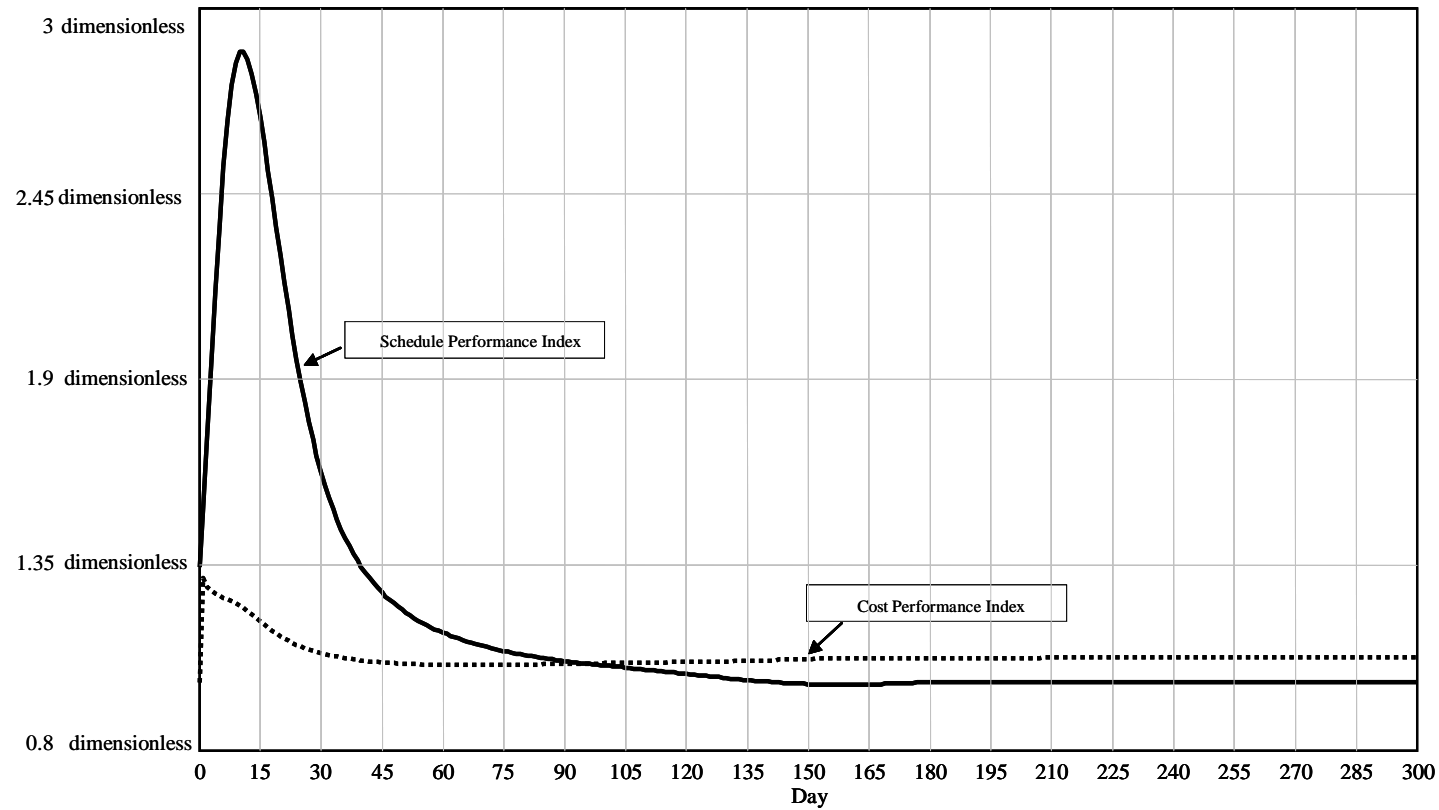
Workforce Idling and Actual Productivity



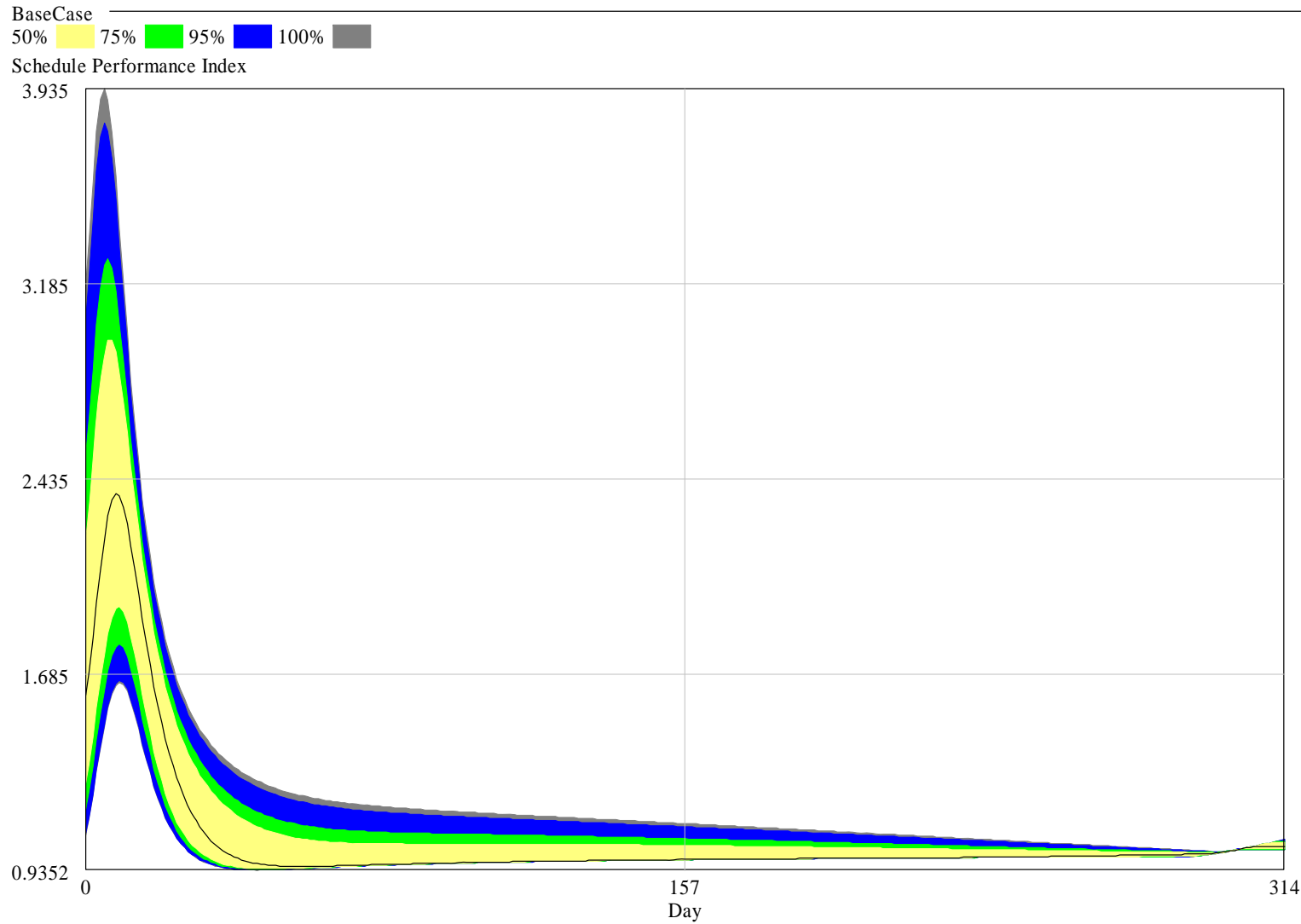
Resource-Constraint Period

Project Performance Indexes

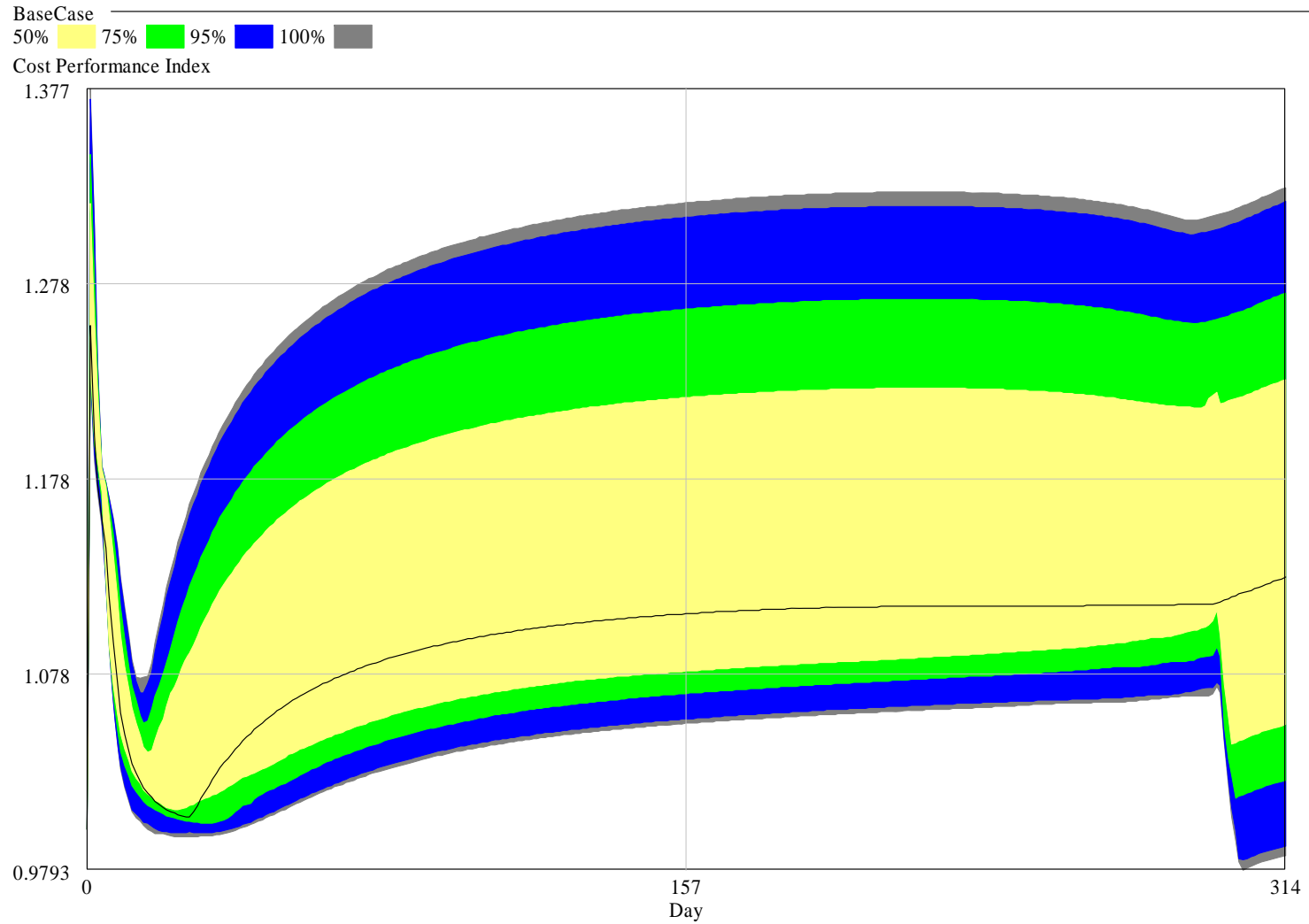
Project Performance Index



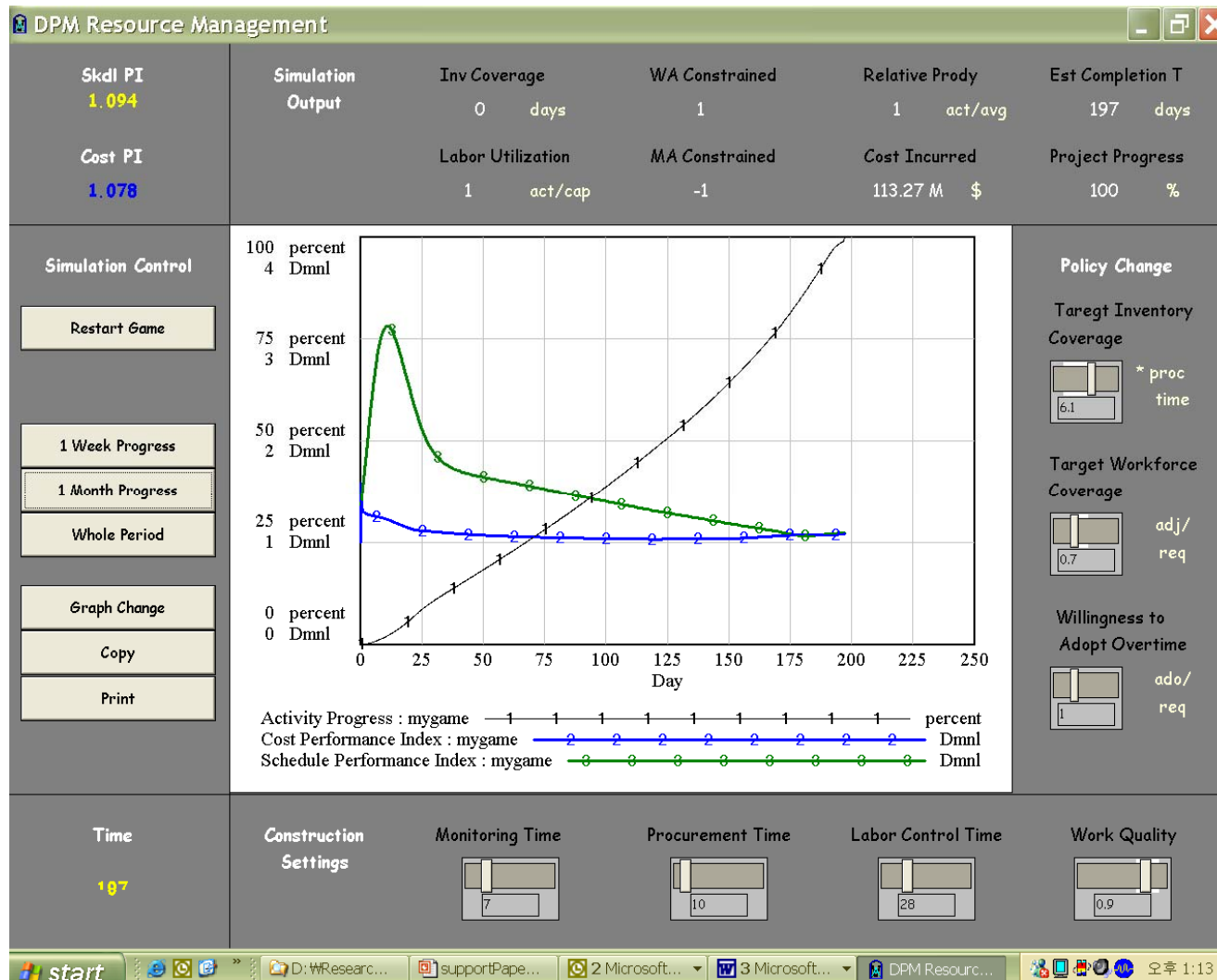
Effect of Workforce Coverage on SPI



Effect of Workforce Coverage on CPI



Construction Gaming



Gaming Tools & File Types

- VENAPP
- xxx.mdl xxx.vmf
- xxx.vdf
- xxx.vcd
- xxx.vgd
- xxx.cin
- xxx.lst

References

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