

BAB V
ANALISIS DAN INTERPRETASI DATA

5.1 Analisis hasil Simulasi

Hasil dari simulasi flowtime total dari 8 jam kerja adalah sebagai berikut :

TALLY VARIABLES					
Identifier	Average	Half width	Minimum	Maximum	observations
flowtime 1	196.45	(Insuf)	71.828	383.13	47
Entity 1.VATime	83.546	(Insuf)	22.332	147.67	47
Entity 1.NVATime	.00000	(Insuf)	.00000	.00000	47
Entity 1.waitTime	112.90	(Insuf)	.00000	272.80	47
Entity 1.TranTime	.00000	(Insuf)	.00000	.00000	47
Entity 1.OtherTime	.00000	(Insuf)	.00000	.00000	47
Entity 1.TotalTime	196.45	(Insuf)	71.828	383.13	47
Assembly 1.Queue.waiti	.00000	(Insuf)	.00000	.00000	42
Bubut 2.Queue.waitingT	104.78	(Insuf)	.00000	229.83	18
Disassembly 1.Queue.wa	.00000	(Insuf)	.00000	.00000	28
Assembly 2.Queue.waiti	.00000	(Insuf)	.00000	.00000	5
Pengelasan 1.Queue.wai	26.531	(Insuf)	.00000	80.553	19
Bubut 3.Queue.waitingT	81.501	(Insuf)	.00000	191.27	20
Disassembly 2.Queue.wa	2.4124	(Insuf)	.00000	8.9555	21
Assembly 3.Queue.waiti	--	--	--	--	0
Pengelasan 2.Queue.wai	27.253	(Insuf)	.00000	82.831	14
Pengecatan 1.Queue.wai	.00000	(Insuf)	.00000	.00000	37
Pengecatan 2.Queue.wai	.00000	(Insuf)	.00000	.00000	8
Disassembly 3.Queue.wa	1.1885	(Insuf)	.00000	3.5734	18
Pengelasan 3.Queue.wai	12.876	(Insuf)	.00000	64.972	16
Pengecatan 3.Queue.wai	.00000	(Insuf)	.00000	.00000	2
Bubut 1.Queue.waitingT	109.89	(Insuf)	.00000	259.24	14

Gambar 5.1 flowtime 8 jam kerja replikasi 1

TALLY VARIABLES					
Identifier	Average	Half width	Minimum	Maximum	observations
flowtime 1	80.479	(Insuf)	20.150	178.91	35
Entity 1.VATime	66.855	(Insuf)	20.150	178.91	35
Entity 1.NVATime	.00000	(Insuf)	.00000	.00000	35
Entity 1.waitTime	13.624	(Insuf)	.00000	73.054	35
Entity 1.TranTime	.00000	(Insuf)	.00000	.00000	35
Entity 1.OtherTime	.00000	(Insuf)	.00000	.00000	35
Entity 1.TotalTime	80.479	(Insuf)	20.150	178.91	35
Assembly 1.Queue.waiti	.00000	(Insuf)	.00000	.00000	31
Bubut 2.Queue.waitingT	11.993	(Insuf)	.00000	73.054	16
Disassembly 1.Queue.wa	.00000	(Insuf)	.00000	.00000	24
Assembly 2.Queue.waiti	.00000	(Insuf)	.00000	.00000	5
Pengelasan 1.Queue.wai	5.2778	(Insuf)	.00000	42.463	17
Bubut 3.Queue.waitingT	9.5209	(Insuf)	.00000	36.920	13
Disassembly 2.Queue.wa	1.6263	(Insuf)	.00000	5.6994	17
Assembly 3.Queue.waiti	--	--	--	--	0
Pengelasan 2.Queue.wai	.68918	(Insuf)	.00000	8.2701	12
Pengecatan 1.Queue.wai	.00000	(Insuf)	.00000	.00000	26
Pengecatan 2.Queue.wai	.00000	(Insuf)	.00000	.00000	8
Disassembly 3.Queue.wa	1.4012	(Insuf)	.00000	7.0327	12
Pengelasan 3.Queue.wai	.00000	(Insuf)	.00000	.00000	7
Pengecatan 3.Queue.wai	.00000	(Insuf)	.00000	.00000	2
Bubut 1.Queue.waitingT	9.8770	(Insuf)	.00000	70.212	10

Gambar 5.2 flowtime 8 jam kerja replikasi 2

TALLY VARIABLES					
Identifier	Average	Half width	Minimum	Maximum	Observations
flowtime 1	96.987	(Insuf)	16.574	206.07	36
Entity 1.VATime	65.540	(Insuf)	16.574	115.66	36
Entity 1.NVATime	.00000	(Insuf)	.00000	.00000	36
Entity 1.WaitTime	31.446	(Insuf)	.00000	122.62	36
Entity 1.TranTime	.00000	(Insuf)	.00000	.00000	36
Entity 1.OtherTime	.00000	(Insuf)	.00000	.00000	36
Entity 1.TotalTime	96.987	(Insuf)	16.574	206.07	36
Assembly 1.Queue.waiti	.00000	(Insuf)	.00000	.00000	30
Bubut 2.Queue.waitingT	49.298	(Insuf)	.00000	116.18	13
Disassembly 1.Queue.wa	.00000	(Insuf)	.00000	.00000	22
Assembly 2.Queue.waiti	.00000	(Insuf)	.00000	.00000	7
Pengelasan 1.Queue.wai	2.0572	(Insuf)	.00000	14.451	16
Bubut 3.Queue.waitingT	26.080	(Insuf)	.00000	91.173	13
Disassembly 2.Queue.wa	1.7449	(Insuf)	.00000	6.4428	18
Assembly 3.Queue.waiti	.00000	(Insuf)	.00000	.00000	1
Pengelasan 2.Queue.wai	3.8500	(Insuf)	.00000	38.500	10
Pengecatan 1.Queue.wai	.00000	(Insuf)	.00000	.00000	28
Pengecatan 2.Queue.wai	.00000	(Insuf)	.00000	.00000	7
Disassembly 3.Queue.wa	1.2966	(Insuf)	.00000	5.1672	12
Pengelasan 3.Queue.wai	.22062	(Insuf)	.00000	3.0887	14
Pengecatan 3.Queue.wai	.00000	(Insuf)	.00000	.00000	3
Bubut 1.Queue.waitingT	12.571	(Insuf)	.00000	69.281	17

Gambar 5.3 flowtime 8 jam kerja replikasi 3

Hasil dari simulasi flowtime total dari 12 jam kerja adalah sebagai berikut :

TALLY VARIABLES					
Identifier	Average	Half width	Minimum	Maximum	observations
flowtime 1	148.46	(Insuf)	31.206	315.89	50
Entity 1.VATime	82.479	(Insuf)	23.812	159.65	50
Entity 1.NVATime	.00000	(Insuf)	.00000	.00000	50
Entity 1.waitTime	65.984	(Insuf)	.00000	213.14	50
Entity 1.TranTime	.00000	(Insuf)	.00000	.00000	50
Entity 1.OtherTime	.00000	(Insuf)	.00000	.00000	50
Entity 1.TotalTime	148.46	(Insuf)	31.206	315.89	50
Assembly 1.Queue.waiti	.00000	(Insuf)	.00000	.00000	40
Bubut 2.Queue.waitingT	69.933	(Insuf)	.00000	208.15	21
Disassembly 1.Queue.wa	.00000	(Insuf)	.00000	.00000	20
Assembly 2.Queue.waiti	.00000	(Insuf)	.00000	.00000	10
Pengelasan 1.Queue.wai	6.9571	(Insuf)	.00000	56.567	23
Bubut 3.Queue.waitingT	68.191	(Insuf)	.00000	174.22	14
Disassembly 2.Queue.wa	2.6354	(Insuf)	.00000	10.217	17
Assembly 3.Queue.waiti	--	--	--	--	0
Pengelasan 2.Queue.wai	3.2552	(Insuf)	.00000	31.379	16
Pengecatan 1.Queue.wai	.00000	(Insuf)	.00000	.00000	34
Pengecatan 2.Queue.wai	.00000	(Insuf)	.00000	.00000	13
Disassembly 3.Queue.wa	1.2967	(Insuf)	.00000	5.5876	14
Pengelasan 3.Queue.wai	.66451	(Insuf)	.00000	7.9741	12
Pengecatan 3.Queue.wai	.00000	(Insuf)	.00000	.00000	3
Bubut 1.Queue.waitingT	37.056	(Insuf)	.00000	166.63	16

Gambar 5.4 flowtime 12 jam kerja replikasi 1

TALLY VARIABLES					
Identifier	Average	Half width	Minimum	Maximum	Observations
flowtime 1	97.320	(Insuf)	23.354	204.18	49
Entity 1.VATime	72.163	(Insuf)	23.354	150.50	49
Entity 1.NVATime	.00000	(Insuf)	.00000	.00000	49
Entity 1.WaitTime	25.157	(Insuf)	.00000	119.23	49
Entity 1.TranTime	.00000	(Insuf)	.00000	.00000	49
Entity 1.OtherTime	.00000	(Insuf)	.00000	.00000	49
Entity 1.TotalTime	97.320	(Insuf)	23.354	204.18	49
Assembly 1.Queue.waiti	.00000	(Insuf)	.00000	.00000	42
Bubut 2.Queue.waitingT	20.245	(Insuf)	.00000	73.054	18
Disassembly 1.Queue.wa	.00000	(Insuf)	.00000	.00000	20
Assembly 2.Queue.waiti	.00000	(Insuf)	.00000	.00000	6
Pengelasan 1.Queue.wai	6.8499	(Insuf)	.00000	94.886	23
Bubut 3.Queue.waitingT	16.707	(Insuf)	.00000	59.962	15
Disassembly 2.Queue.wa	1.3985	(Insuf)	.00000	5.0636	17
Assembly 3.Queue.waiti	.00000	(Insuf)	.00000	.00000	1
Pengelasan 2.Queue.wai	1.4276	(Insuf)	.00000	27.125	19
Pengecatan 1.Queue.wai	.00000	(Insuf)	.00000	.00000	39
Pengecatan 2.Queue.wai	.00000	(Insuf)	.00000	.00000	8
Disassembly 3.Queue.wa	1.2783	(Insuf)	.00000	7.3917	12
Pengelasan 3.Queue.wai	3.4838	(Insuf)	.00000	24.387	7
Pengecatan 3.Queue.wai	.00000	(Insuf)	.00000	.00000	2
Bubut 1.Queue.waitingT	23.094	(Insuf)	.00000	115.83	16

Gambar 5.5 flowtime 12 jam kerja replikasi 2

TALLY VARIABLES					
Identifier	Average	Half width	Minimum	Maximum	Observations
flowtime 1	76.971	(Insuf)	21.634	234.02	21
Entity 1.VATime	67.826	(Insuf)	21.634	164.00	21
Entity 1.NVATime	.00000	(Insuf)	.00000	.00000	21
Entity 1.WaitTime	9.1452	(Insuf)	.00000	70.027	21
Entity 1.TranTime	.00000	(Insuf)	.00000	.00000	21
Entity 1.OtherTime	.00000	(Insuf)	.00000	.00000	21
Entity 1.TotalTime	76.971	(Insuf)	21.634	234.02	21
Assembly 1.Queue.waiti	.00000	(Insuf)	.00000	.00000	20
Bubut 2.Queue.waitingT	18.212	(Insuf)	.00000	70.027	10
Disassembly 1.Queue.wa	.00000	(Insuf)	.00000	.00000	14
Assembly 2.Queue.waiti	.00000	(Insuf)	.00000	.00000	1
Pengelasan 1.Queue.wai	.00000	(Insuf)	.00000	.00000	17
Bubut 3.Queue.waitingT	10.674	(Insuf)	.00000	64.373	8
Disassembly 2.Queue.wa	.39546	(Insuf)	.00000	2.7682	7
Assembly 3.Queue.waiti	--	--	--	--	0
Pengelasan 2.Queue.wai	.00000	(Insuf)	.00000	.00000	3
Pengecatan 1.Queue.wai	.00000	(Insuf)	.00000	.00000	19
Pengecatan 2.Queue.wai	.00000	(Insuf)	.00000	.00000	2
Disassembly 3.Queue.wa	.00000	(Insuf)	.00000	.00000	6
Pengelasan 3.Queue.wai	.00000	(Insuf)	.00000	.00000	2
Pengecatan 3.Queue.wai	--	--	--	--	0
Bubut 1.Queue.waitingT	.00000	(Insuf)	.00000	.00000	7

Gambar 5.6 flowtime 12 jam kerja replikasi 3

Hasil dari simulasi total input dan output dari 8 jam kerja adalah sebagai berikut :

Identifier	Value
Entity 1.NumberIn	79.000
Entity 1.NumberOut	59.000
Resource 1.TimesUsed	28.000
Resource 1.Scheduleduti	.00366
Resource 2.TimesUsed	21.000
Resource 2.Scheduleduti	.08280
Resource 3.TimesUsed	18.000
Resource 3.Scheduleduti	.06048
Resource 4.TimesUsed	14.000
Resource 4.Scheduleduti	.92818
Resource 5.TimesUsed	18.000
Resource 5.Scheduleduti	.93071
Resource 6.TimesUsed	20.000
Resource 6.Scheduleduti	.86319
Resource 7.TimesUsed	19.000
Resource 7.Scheduleduti	.88186
Resource 8.TimesUsed	14.000
Resource 8.Scheduleduti	.83803
Resource 9.TimesUsed	16.000
Resource 9.Scheduleduti	.62551
Resource 10.TimesUsed	37.000
Resource 10.Scheduledut	.28693
Resource 11.TimesUsed	8.0000
Resource 11.Scheduledut	.07826
Resource 12.TimesUsed	2.0000
Resource 12.Scheduledut	.01424
Resource 13.TimesUsed	42.000
Resource 13.Scheduledut	.17761
Resource 14.TimesUsed	5.0000
Resource 14.Scheduledut	.01975
Resource 15.TimesUsed	.00000
Resource 15.Scheduledut	.00000
System.NumberOut	47.000

Gambar 5.7 total input dan output 8 jam kerja replikasi 1.

Identifier	Value
Entity 1.NumberIn	65.000
Entity 1.NumberOut	47.000
Resource 1.TimesUsed	24.000
Resource 1.Scheduleduti	.00307
Resource 2.TimesUsed	17.000
Resource 2.Scheduleduti	.07269
Resource 3.TimesUsed	12.000
Resource 3.Scheduleduti	.04626
Resource 4.TimesUsed	10.000
Resource 4.Scheduleduti	.41070
Resource 5.TimesUsed	16.000
Resource 5.Scheduleduti	.64900
Resource 6.TimesUsed	13.000
Resource 6.Scheduleduti	.38933
Resource 7.TimesUsed	17.000
Resource 7.Scheduleduti	.67927
Resource 8.TimesUsed	12.000
Resource 8.Scheduleduti	.38594
Resource 9.TimesUsed	7.0000
Resource 9.Scheduleduti	.37830
Resource 10.TimesUsed	26.000
Resource 10.Scheduledut	.23660
Resource 11.TimesUsed	8.0000
Resource 11.Scheduledut	.07751
Resource 12.TimesUsed	2.0000
Resource 12.Scheduledut	.02017
Resource 13.TimesUsed	31.000
Resource 13.Scheduledut	.13342
Resource 14.TimesUsed	5.0000
Resource 14.Scheduledut	.01986
Resource 15.TimesUsed	.00000
Resource 15.Scheduledut	.00000
System.NumberOut	35.000

Gambar 5.8 total input dan output 8 jam kerja replikasi 2.

Identifier	Value
Entity 1.NumberIn	61.000
Entity 1.NumberOut	45.000
Resource 1.TimesUsed	22.000
Resource 1.Scheduleduti	.00278
Resource 2.TimesUsed	18.000
Resource 2.Scheduleduti	.07067
Resource 3.TimesUsed	12.000
Resource 3.Scheduleduti	.04072
Resource 4.TimesUsed	17.000
Resource 4.Scheduleduti	.54536
Resource 5.TimesUsed	13.000
Resource 5.Scheduleduti	.69368
Resource 6.TimesUsed	13.000
Resource 6.Scheduleduti	.57049
Resource 7.TimesUsed	16.000
Resource 7.Scheduleduti	.52836
Resource 8.TimesUsed	10.000
Resource 8.Scheduleduti	.44090
Resource 9.TimesUsed	14.000
Resource 9.Scheduleduti	.20324
Resource 10.TimesUsed	28.000
Resource 10.Scheduledut	.23977
Resource 11.TimesUsed	7.0000
Resource 11.Scheduledut	.05807
Resource 12.TimesUsed	3.0000
Resource 12.Scheduledut	.03657
Resource 13.TimesUsed	30.000
Resource 13.Scheduledut	.12464
Resource 14.TimesUsed	7.0000
Resource 14.Scheduledut	.02070
Resource 15.TimesUsed	1.0000
Resource 15.Scheduledut	.00174
System.NumberOut	36.000

Gambar 5.9 total input dan output 8 jam kerja replikasi 3.

Hasil dari simulasi total input dan output dari 12 jam kerja adalah sebagai berikut :

Identifier	Value
Entity 1.NumberIn	67.000
Entity 1.NumberOut	66.000
Resource 1.TimesUsed	20.000
Resource 1.Scheduleduti	.00155
Resource 2.TimesUsed	17.000
Resource 2.Scheduleduti	.04941
Resource 3.TimesUsed	14.000
Resource 3.Scheduleduti	.03524
Resource 4.TimesUsed	16.000
Resource 4.Scheduleduti	.50886
Resource 5.TimesUsed	21.000
Resource 5.Scheduleduti	.66592
Resource 6.TimesUsed	14.000
Resource 6.Scheduleduti	.55259
Resource 7.TimesUsed	23.000
Resource 7.Scheduleduti	.66571
Resource 8.TimesUsed	16.000
Resource 8.Scheduleduti	.59089
Resource 9.TimesUsed	12.000
Resource 9.Scheduleduti	.33359
Resource 10.TimesUsed	34.000
Resource 10.Scheduledut	.21174
Resource 11.TimesUsed	13.000
Resource 11.Scheduledut	.07144
Resource 12.TimesUsed	3.0000
Resource 12.Scheduledut	.02538
Resource 13.TimesUsed	40.000
Resource 13.Scheduledut	.11056
Resource 14.TimesUsed	10.000
Resource 14.Scheduledut	.02363
Resource 15.TimesUsed	.00000
Resource 15.Scheduledut	.00000
System.NumberOut	50.000

Gambar 5.10 total input dan output 12 jam kerja replikasi 1.

Identifier	Value
Entity 1.NumberIn	58.000
Entity 1.NumberOut	58.000
Resource 1.TimesUsed	20.000
Resource 1.Scheduleduti	.00156
Resource 2.TimesUsed	17.000
Resource 2.Scheduleduti	.04528
Resource 3.TimesUsed	12.000
Resource 3.Scheduleduti	.02932
Resource 4.TimesUsed	16.000
Resource 4.Scheduleduti	.59202
Resource 5.TimesUsed	18.000
Resource 5.Scheduleduti	.50476
Resource 6.TimesUsed	15.000
Resource 6.Scheduleduti	.47003
Resource 7.TimesUsed	23.000
Resource 7.Scheduleduti	.63451
Resource 8.TimesUsed	19.000
Resource 8.Scheduleduti	.32676
Resource 9.TimesUsed	7.0000
Resource 9.Scheduleduti	.16814
Resource 10.TimesUsed	39.000
Resource 10.Scheduledut	.24604
Resource 11.TimesUsed	8.0000
Resource 11.Scheduledut	.04874
Resource 12.TimesUsed	2.0000
Resource 12.Scheduledut	.01341
Resource 13.TimesUsed	42.000
Resource 13.Scheduledut	.12260
Resource 14.TimesUsed	6.0000
Resource 14.Scheduledut	.01815
Resource 15.TimesUsed	1.0000
Resource 15.Scheduledut	.00277
System.NumberOut	49.000

Gambar 5.11 total input dan output 12 jam kerja replikasi 2.

Identifier	Value
Entity 1.NumberIn	42.000
Entity 1.NumberOut	36.000
Resource 1.TimesUsed	14.000
Resource 1.Scheduleduti	.00103
Resource 2.TimesUsed	7.0000
Resource 2.Scheduleduti	.01580
Resource 3.TimesUsed	6.0000
Resource 3.Scheduleduti	.01983
Resource 4.TimesUsed	7.0000
Resource 4.Scheduleduti	.06772
Resource 5.TimesUsed	10.000
Resource 5.Scheduleduti	.47406
Resource 6.TimesUsed	8.0000
Resource 6.Scheduleduti	.20289
Resource 7.TimesUsed	17.000
Resource 7.Scheduleduti	.30703
Resource 8.TimesUsed	3.0000
Resource 8.Scheduleduti	.13490
Resource 9.TimesUsed	2.0000
Resource 9.Scheduleduti	.04914
Resource 10.TimesUsed	19.000
Resource 10.Scheduledut	.11915
Resource 11.TimesUsed	2.0000
Resource 11.Scheduledut	.01361
Resource 12.TimesUsed	.00000
Resource 12.Scheduledut	.00000
Resource 13.TimesUsed	20.000
Resource 13.Scheduledut	.06613
Resource 14.TimesUsed	1.0000
Resource 14.Scheduledut	.00249
Resource 15.TimesUsed	.00000
Resource 15.Scheduledut	.00000
System.NumberOut	21.000

Gambar 5.12 total input dan output 12 jam kerja replikasi 3.

5.2 Usulan skenario perbaikan

5.2.1 Solusi penambahan jam kerja

Perbandingan penambahan jam kerja menjadi 12 jam kerja total flowtime menjadi lebih cepat. Dapat dilihat pada tabel 5.1 dibawah ini.

	Replikasi 1	Replikasi 2	Replikasi 3
8 jam kerja	196,46	80,479	96,987
12 jam kerja	148,46	97,320	76,971

Perbandingan penambahan jam kerja menjadi 12 jam kerja total input output job yang dilayani hampir semua dapat terselesaikan. Dapat dilihat pada tabel 5.2 dibawah ini.

	Replikasi 1		Replikasi 2		Replikasi 3	
	Input	Output	Input	Output	Input	Output
8 jam kerja	79	59	65	47	61	45
12 jam kerja	67	66	58	58	42	36