

BAB 6

KESIMPULAN DAN SARAN

6.1. Kesimpulan

Berdasarkan hasil penelitian pada bagian penyusunan buku di UD Graha Grafika, maka dapat ditarik beberapa kesimpulan sebagai berikut :

- a. Model simulasi sistem penyusunan buku yang telah dibuat merupakan model yang dilihat dari sistem nyata yang kemudian diaplikasikan menggunakan bantuan *software ARENA 7.01*. Dari hasil uji verifikasi dan validasi model yang telah dibuat, hasilnya sudah mempresentasikan sistem yang nyata.
- b. Berdasar model simulasi sistem penyusunan buku yang telah dibuat, pengalokasian tenaga kerja yang terdapat di bagian penyusunan buku UD Graha Grafika tidak efisien.
- c. Alternatif alokasi tenaga kerja dibuat berdasarkan kategori jenis buku, jumlah *order*, dan jumlah halaman buku. Alternatif terbaik yang dipilih adalah alternatif dengan *average total time* yang tidak melebihi waktu yang tersedia pada bagian penyusunan buku.
- d. Dari penelitian ini dihasilkan sebuah pedoman sederhana yang dapat digunakan oleh perusahaan untuk menentukan alokasi dan jumlah tenaga kerja yang dibutuhkan untuk menangani suatu *order*. Pedoman yang telah dibuat berdasarkan model

simulasi penyusunan buku di UD Graha Grafika dapat dilihat pada Tabel 5.15, 5.16, dan 5.17.

6.2. Saran

Penulis menyarankan kepada pemilik UD Graha Grafika agar pada bagian penyusunan buku dilakukan pengurangan tenaga kerja. Pengalokasian tenaga kerjanya disesuaikan dengan pedoman yang telah dibuat.



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Data Order Buku Tipe A, B, dan C

Tipe Buku	Jumlah eksemplar	Jumlah Halaman	Jumlah Operator	Proses	Identitas Operator
A	300	48	4	susun	1,2
				ambil	1,2,3,4
				treking	3,4
				gabung	1,2,3,4
B	2100	17	5	susun	1,2
				ambil	1,2,3,4
				trek	3,4
				potong	5
				gabung	3,4
C	2100	7	5	susun	1,2
				ambil	1,2
				trek	3,4
				staples	5
				lipat	1,2

Pola Distribusi Waktu Proses Penyusunan Buku Tipe A

susun

Distribution Summary

Distribution: Triangular
Expression: TRIA(7, 9.41, 16)
Square Error: 0.012356

Chi Square Test

Number of intervals = 3
Degrees of freedom = 1
Test Statistic = 0.975
Corresponding p-value = 0.35

Kolmogorov-Smirnov Test

Test Statistic = 0.136
Corresponding p-value > 0.15

Data Summary

Number of Data Points = 26
Min Data Value = 7
Max Data Value = 16
Sample Mean = 10.8
Sample Std Dev = 2.57

Histogram Summary

Histogram Range = 7 to 16
Number of Intervals = 5

ambil

Distribution Summary

Distribution: Erlang
Expression: ERLA(0.19, 5)
Square Error: 0.008696

Chi Square Test

Number of intervals = 3
Degrees of freedom = 0
Test Statistic = 8.12
Corresponding p-value < 0.005

Kolmogorov-Smirnov Test

Test Statistic = 0.2
Corresponding p-value < 0.01

Data Summary

Number of Data Points = 100
Min Data Value = 0.5
Max Data Value = 7
Sample Mean = 0.949
Sample Std Dev = 0.728

Histogram Summary

Histogram Range = 0 to 7
Number of Intervals = 10

trek

Distribution Summary

Distribution: Gamma
Expression: $9 + \text{GAMM}(2.54, 3.49)$
Square Error: 0.034896

Chi Square Test

Number of intervals = 4
Degrees of freedom = 1
Test Statistic = 10.2
Corresponding p-value < 0.005

Kolmogorov-Smirnov Test

Test Statistic = 0.21
Corresponding p-value = 0.0501

Data Summary

Number of Data Points = 40
Min Data Value = 9.2
Max Data Value = 34.1
Sample Mean = 17.8
Sample Std Dev = 4.42

Histogram Summary

Histogram Range = 9 to 35
Number of Intervals = 6

gabung

Distribution Summary

Distribution: Beta
Expression: $11 + 36 * \text{BETA}(1.2, 4.55)$
Square Error: 0.008677

Chi Square Test

Number of intervals = 4
Degrees of freedom = 1
Test Statistic = 6.56
Corresponding p-value = 0.0107

Kolmogorov-Smirnov Test

Test Statistic = 0.0913
Corresponding p-value > 0.15

Data Summary

Number of Data Points = 70
Min Data Value = 11.1
Max Data Value = 46.9
Sample Mean = 18.5
Sample Std Dev = 5.63

Histogram Summary

Histogram Range = 11 to 47
Number of Intervals = 8

Pola Distribusi Waktu Proses Penyusunan Buku Tipe B

susun

Distribution Summary

Distribution: Erlang
Expression: $6 + \text{ERLA}(1.69, 2)$
Square Error: 0.020290

Kolmogorov-Smirnov Test

Test Statistic = 0.111
Corresponding p-value > 0.15

Data Summary

Number of Data Points = 15
Min Data Value = 6.2
Max Data Value = 14.7
Sample Mean = 9.39
Sample Std Dev = 2.48

Histogram Summary

Histogram Range = 6 to 15
Number of Intervals = 5

ambil

Distribution Summary

Distribution: Lognormal
Expression: $\text{LOGN}(0.996, 0.442)$
Square Error: 0.026802

Chi Square Test

Number of intervals = 4
Degrees of freedom = 1
Test Statistic = 11.4
Corresponding p-value < 0.005

Kolmogorov-Smirnov Test

Test Statistic = 0.148
Corresponding p-value = 0.0234

Data Summary

Number of Data Points = 100

Min Data Value = 0.1
Max Data Value = 3.4
Sample Mean = 0.995
Sample Std Dev = 0.476

Histogram Summary

Histogram Range = 0 to 3.73
Number of Intervals = 10

trek

Distribution Summary

Distribution: Triangular
Expression: TRIA(10, 15.2, 31)
Square Error: 0.000780

Chi Square Test

Number of intervals = 4
Degrees of freedom = 2
Test Statistic = 0.236
Corresponding p-value > 0.75

Kolmogorov-Smirnov Test

Test Statistic = 0.0888
Corresponding p-value > 0.15

Data Summary

Number of Data Points = 40
Min Data Value = 10
Max Data Value = 30.8
Sample Mean = 18.3
Sample Std Dev = 4.69

Histogram Summary

Histogram Range = 10 to 31
Number of Intervals = 6

potong

Distribution Summary

Distribution: Beta
Expression: 50 + 128 * BETA(0.457, 0.663)
Square Error: 0.022572

Kolmogorov-Smirnov Test

Test Statistic= 0.248
Corresponding p-value > 0.15

Data Summary

Number of Data Points = 11
Min Data Value = 50.5
Max Data Value = 178
Sample Mean = 91.4
Sample Std Dev = 41.9

Histogram Summary

Histogram Range = 50 to 178
Number of Intervals = 5

gabung

Distribution Summary

Distribution: Lognormal
Expression: $5 + \text{LOGN}(5.64, 5.11)$
Square Error: 0.070128

Chi Square Test

Number of intervals = 2
Degrees of freedom = -1
Test Statistic = 0.927
Corresponding p-value < 0.005

Kolmogorov-Smirnov Test

Test Statistic= 0.152
Corresponding p-value > 0.15

Data Summary

Number of Data Points = 20
Min Data Value = 5.3
Max Data Value = 14.9
Sample Mean = 10.2
Sample Std Dev = 2.88

Histogram Summary

Histogram Range = 5 to 15
Number of Intervals = 5

Pola Distribusi Waktu Proses Penyusunan Buku Tipe C

susun

Distribution Summary

Distribution: Beta
Expression: $56 + 26 * \text{BETA}(0.723, 0.892)$
Square Error: 0.017726

Kolmogorov-Smirnov Test

Test Statistic= 0.192
Corresponding p-value > 0.15

Data Summary

Number of Data Points = 7
Min Data Value = 56.5
Max Data Value = 81.3
Sample Mean = 67.1
Sample Std Dev = 8.24

Histogram Summary

Histogram Range - 56 to 82
Number of Intervals = 5

ambil

Distribution Summary

Distribution: Lognormal
Expression: $0.07 + \text{LOGN}(1.03, 0.425)$
Square Error: 0.045734

Chi Square Test

Number of intervals = 3
Degrees of freedom = 0
Test Statistic = 12.3
Corresponding p-value < 0.005

Kolmogorov-Smirnov Test

Test Statistic= 0.151
Corresponding p-value = 0.02

Data Summary

Number of Data Points = 100
Min Data Value = 0.5
Max Data Value = 4.8
Sample Mean = 1.12

Sample Std Dev = 0.66

Histogram Summary

Histogram Range = 0.07 to 5
Number of Intervals = 10

trek

Distribution Summary

Distribution: Gamma
Expression: $22 + \text{GAMM}(7.64, 1.35)$
Square Error: 0.013474

Chi Square Test

Number of intervals = 2
Degrees of freedom = -1
Test Statistic = 0.389
Corresponding p-value < 0.005

Kolmogorov-Smirnov Test

Test Statistic = 0.0838
Corresponding p-value > 0.15

Data Summary

Number of Data Points = 30
Min Data Value = 22.3
Max Data Value = 69.4
Sample Mean = 32.3
Sample Std Dev = 9.57

Histogram Summary

Histogram Range = 22 to 70
Number of Intervals = 5

staples

Distribution Summary

Distribution: Weibull
Expression: $2 + \text{WEIB}(4.28, 1.58)$
Square Error: 0.004017

Chi Square Test

Number of intervals = 3
Degrees of freedom = 0
Test Statistic = 1.1
Corresponding p-value < 0.005

Kolmogorov-Smirnov Test

Test Statistic = 0.124

Corresponding p-value > 0.15

Data Summary

Number of Data Points = 60
Min Data Value = 2.9
Max Data Value = 18.4
Sample Mean = 5.8
Sample Std Dev = 2.72

Histogram Summary

Histogram Range = 2 to 19
Number of Intervals = 7

lipat

Distribution Summary

Distribution: Erlang
Expression: 4 + ERLA(1.41, 5)
Square Error: 0.017721

Chi Square Test

Number of intervals = 3
Degrees of freedom = 0
Test Statistic = 1.14
Corresponding p-value < 0.005

Kolmogorov-Smirnov Test

Test Statistic = 0.201
Corresponding p-value = 0.104

Data Summary

Number of Data Points = 35
Min Data Value = 4.3
Max Data Value = 20.9
Sample Mean = 11
Sample Std Dev = 2.71

Histogram Summary

Histogram Range = 4 to 21
Number of Intervals = 5

Values Across All Replications

Named Project

Replications: 3 Time Units: Hours

Key Performance Indicators

System

Number Out

Average
300

Entity

Time

Maximum
Minimum
Maximum

Minimum

Entity 1

VA Time
Maximum
Minimum
Maximum

Average
Average
Value
Value

Half Width

Average

0.6543

0.01

0.6274
Minimum

0.6746

0.4269

1.1997

Entity 1

Wait Time
Maximum
Minimum
Maximum

Average
Average
Value
Value

Half Width

Average

0.00

0.00

0.00
Minimum

0.00

0.00

0.00

Entity 1

Transfer Time
Maximum
Minimum
Maximum

Average
Average
Value
Value

Half Width

Average

270.97

0.74

269.51
Minimum

272.28

254.62

287.87

Entity 1

Other Time
Maximum

Average
Average
Value
Value

Half Width

Average

0.00

0.00

0.00
Minimum

0.00

0.00

0.00

85

Minimum
Maximum

Average
Average
Value
Value

Half Width

Average

Category 1
Total Time
Maximum
Minimum
Maximum

0.00 0.00 0.00 0.00 0.00 0.00

Minimum

Average
Average
Value
Value

Half Width

Average

Category 1
Number In
Maximum

7.1296 0.02 7.0681 7.1796 5.8941 8.3794

Minimum

Average
Average

Half Width

Average

Category 1
Number Out
Maximum

14824 0.00 14824.00 14824.00

Minimum

Average
Average

Half Width

Average

Category 1
IP
Maximum
Minimum
Maximum

14824 0.00 14824.00 14824.00

Minimum

Average
Average
Value
Value

Half Width

Average

Category 1
Queue

12403.78 17.84 12362.88 12448.55 0.00 14700.00

Queue
Waiting Time
Maximum
Minimum
Maximum

Minimum

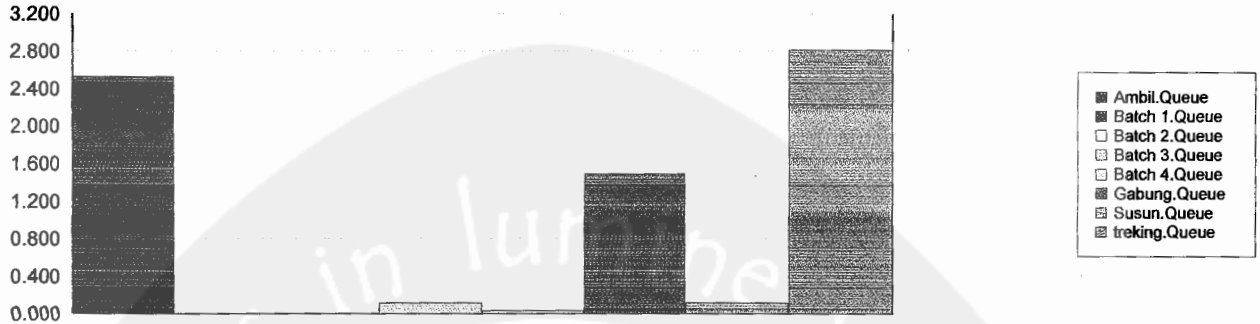
Average
Average
Value
Value

Half Width

Average

Category Overview

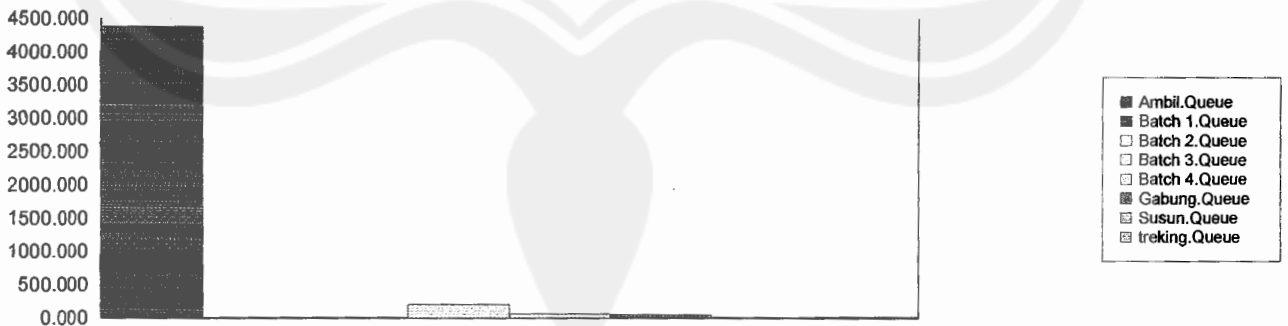
bil.Queue	2.5354	0.01	2.5171	2.5582	0.00	5.0917
ch 1.Queue	0.00	0.00	0.00	0.00	0.00	0.00
ch 2.Queue	0.00	0.00	0.00	0.00	0.00	0.00
ch 3.Queue	0.1162	0.00	0.1098	0.1220	0.00	0.2459
ch 4.Queue	0.03366462	0.00	0.03359258	0.03373658	0.00	0.07466873
abung.Queue	1.4940	0.02	1.4559	1.5292	0.5788	2.4343
un.Queue	0.1173	0.00	0.1126	0.1223	0.00	0.2459
ing.Queue	2.8115	0.01	2.7963	2.8325	0.5795	5.0215



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umber Waiting
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	Average Value	Half Width	Average Value	Minimum	Maximum
bil.Queue	4382.43	15.51	4344.66	4422.30	0.00
ch 1.Queue	0.00	0.00	0.00	0.00	14399.00
ch 2.Queue	0.00	0.00	0.00	0.00	300.00
ch 3.Queue	200.92	3.97	190.35	210.11	48.0000
ch 4.Queue	58.1905	0.20	57.8193	58.7348	14400.00
abung.Queue	53.7999	0.52	52.7230	54.7489	192.00
un.Queue	0.6760	0.01	0.6506	0.7049	299.00
ing.Queue	25.3112	0.10	25.1311	25.5483	47.0000
					74.0000



source

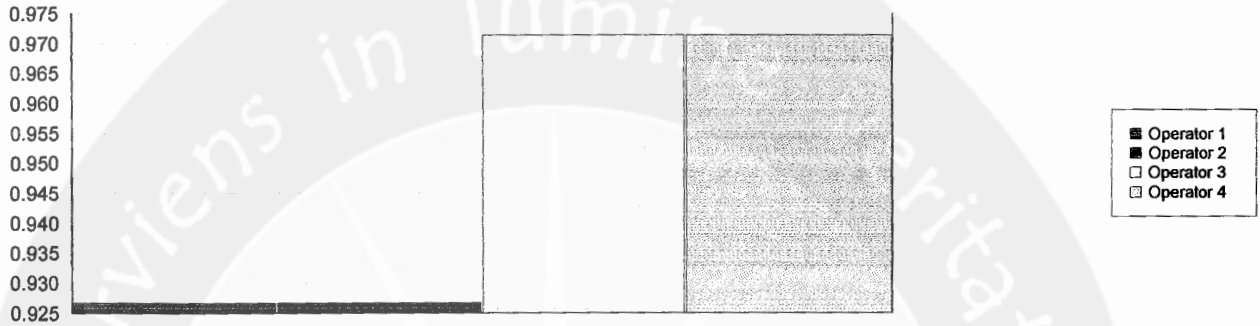
Usage

Instantaneous Utilization

Maximum
Minimum
Maximum

Minimum

	Average Average Value Value	Half Width	Average			
Operator 1	0.9267	0.00	0.9237	0.9294	0.00	1.0000
Operator 2	0.9267	0.00	0.9237	0.9294	0.00	1.0000
Operator 3	0.9714	0.00	0.9702	0.9727	0.00	1.0000
Operator 4	0.9714	0.00	0.9702	0.9727	0.00	1.0000



Number Busy

Maximum
Minimum
Maximum

Minimum

	Average Average Value Value	Half Width	Average			
Operator 1	0.9267	0.00	0.9237	0.9294	0.00	1.0000
Operator 2	0.9267	0.00	0.9237	0.9294	0.00	1.0000
Operator 3	0.9714	0.00	0.9702	0.9727	0.00	1.0000
Operator 4	0.9714	0.00	0.9702	0.9727	0.00	1.0000

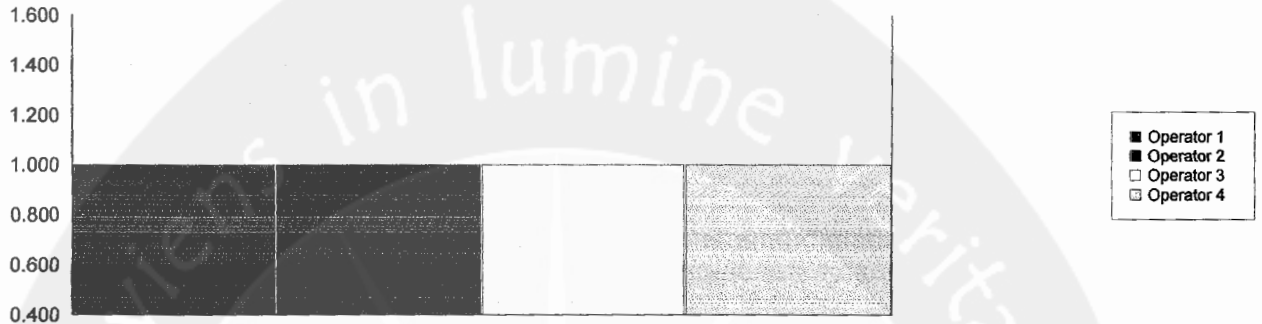


Category Overview

Number Scheduled
Maximum
Minimum
Maximum

Minimum

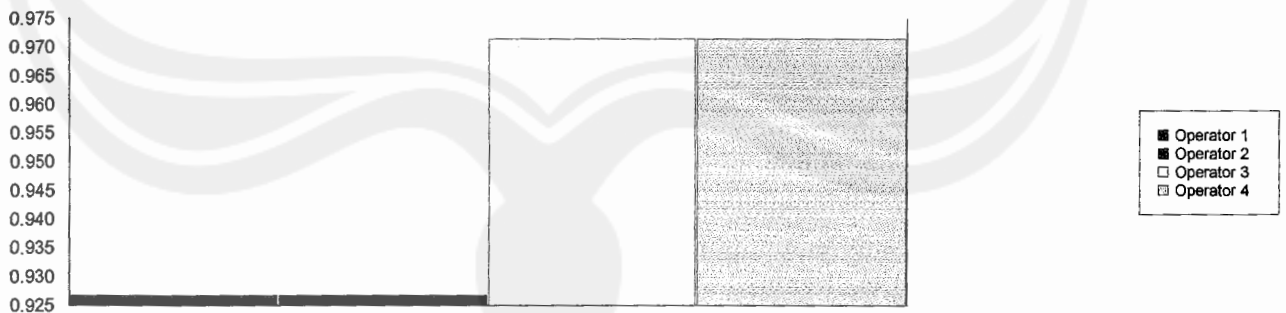
	Average Average Value Value	Half Width	Average			
Operator 1	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Operator 2	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Operator 3	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Operator 4	1.0000	0.00	1.0000	1.0000	1.0000	1.0000



Scheduled Utilization
Maximum

Minimum

	Average Average	Half Width	Average	
Operator 1	0.9267	0.00	0.9237	0.9294
Operator 2	0.9267	0.00	0.9237	0.9294
Operator 3	0.9714	0.00	0.9702	0.9727
Operator 4	0.9714	0.00	0.9702	0.9727



Total Number Seized
Maximum

Minimum

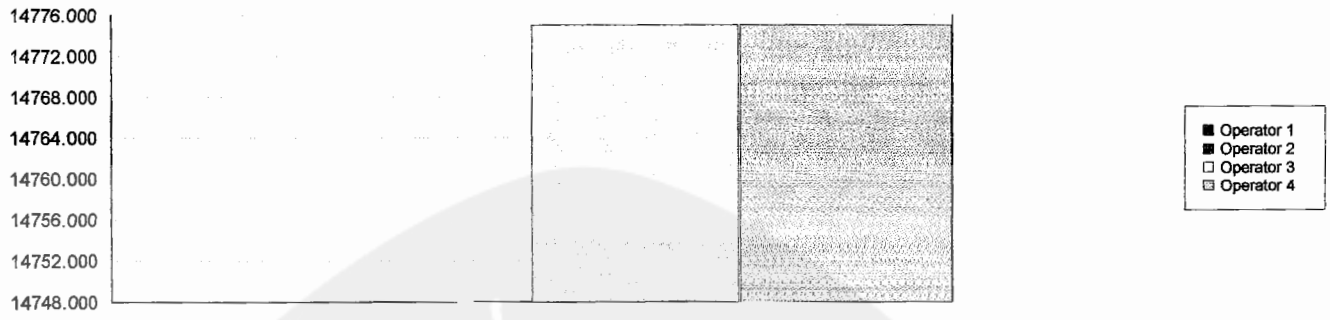
Average
Average

Half Width

Average

Category Overview

Operator 1	14748.00	0.00	14748.00	14748.00
Operator 2	14748.00	0.00	14748.00	14748.00
Operator 3	14775.00	0.00	14775.00	14775.00
Operator 4	14775.00	0.00	14775.00	14775.00



Values Across All Replications

ed Project

ions: 3 Time Units: Hours

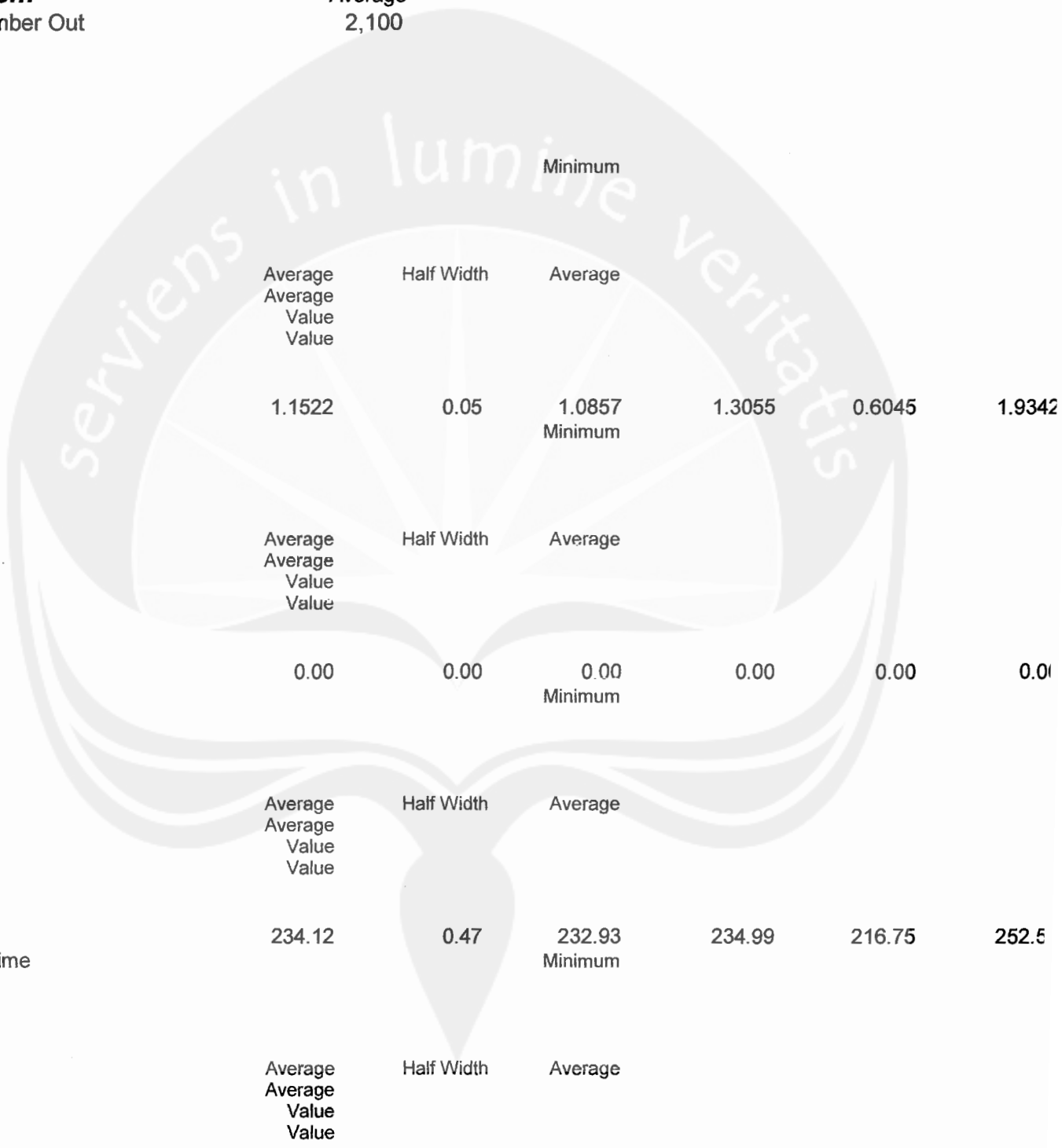
Key Performance Indicators

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Minimum

Average
Average
Value
Value

Half Width

Average

1.1522

0.05

1.0857
Minimum

1.3055

0.6045

1.9342

Average
Average
Value
Value

Half Width

Average

0.00

0.00

0.00
Minimum

0.00

0.00

0.00

Average
Average
Value
Value

Half Width

Average

234.12

0.47

232.93
Minimum

234.99

216.75

252.5

Average
Average
Value
Value

Half Width

Average

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Category Overview

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0.00	0.00	0.00	0.00	0.00	0.00
		Minimum			

n

Average Average Value Value	Half Width	Average			
--------------------------------------	------------	---------	--	--	--

ne

0.00	0.00	0.00	0.00	0.00	0.00
		Minimum			

n

Average Average Value Value	Half Width	Average			
--------------------------------------	------------	---------	--	--	--

In

18.9580	0.06	18.8399	19.1257	14.0759	23.9446
		Minimum			

n

Average Average	Half Width	Average			
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Out

38018	0.00	38018.00	38018.00		
		Minimum			

n

Average Average	Half Width	Average			
--------------------	------------	---------	--	--	--

n

38018	0.00	38018.00	38018.00		
		Minimum			

n

Average Average Value Value	Half Width	Average			
--------------------------------------	------------	---------	--	--	--

n

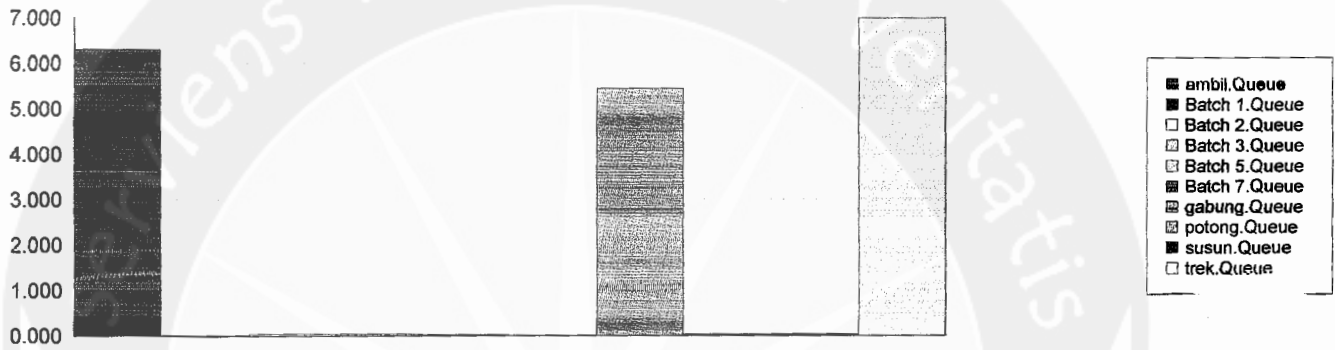
3.4472	0.01	3.4254	3.4790	0.00	37720.0
--------	------	--------	--------	------	---------

g Time
im

Minimum

Category Overview

	Average Average Value Value	Half Width	Average			
ue	6.2978	0.01	6.2774	6.3154	0.00	12.6261
ueue	0.00	0.00	0.00	0.00	0.00	0.00
ueue	0.04120709	0.00	0.03818337	0.04857967	0.00	0.0920
ueue	0.03586249	0.00	0.03572361	0.03597997	0.00	0.07903029
ueue	0.02482237	0.00	0.02404286	0.02600325	0.00	0.06321990
ueue	0.00	0.00	0.00	0.00	0.00	0.00
ueue	5.4338	0.05	5.3572	5.6011	1.2850	9.6964
ueue	0.03244803	0.02	0.00887943	0.08383245	0.00	0.1812
ueue	0.04077938	0.00	0.03583867	0.04739399	0.00	0.0920
ue	6.9792	0.01	6.9470	7.0135	1.3989	12.5551



Waiting

Minimum

	Average Average Value Value	Half Width	Average			
ueue	1.1242	0.00	1.1205	1.1273	0.00	35699.0
Queue	0.00	0.00	0.00	0.00	0.00	2100.0
Queue	0.00735547	0.00	0.00681573	0.00867147	0.00	35700.0
Queue	0.00640146	0.00	0.00637666	0.00642243	0.00	204.0
Queue	0.00443079	0.00	0.00429165	0.00464158	0.00	1428.0
Queue	0.00	0.00	0.00	0.00	0.00	17.000
Queue	0.05705451	0.00	0.05625082	0.05881143	0.00	2087.0
ueue	0.00000406	0.00	0.00000111	0.00001048	0.00	3.000
ueue	0.00000347	0.00	0.00000305	0.00000403	0.00	16.000
ue	0.00610681	0.00	0.00607862	0.00613685	0.00	174.0

Category Overview



- ambal.Queue
- Batch 1.Queue
- Batch 2.Queue
- Batch 3.Queue
- Batch 5.Queue
- Batch 7.Queue
- gabung.Queue
- potong.Queue
- susun.Queue
- trek.Queue

ce

Continuous Utilization

Minimum

	Average Average Value Value	Half Width	Average		
1	0.00006343	0.00	0.00006314	0.00006361	0.00 1.0000
2	0.00006343	0.00	0.00006314	0.00006361	0.00 1.0000
3	0.00011849	0.00	0.00011778	0.00011931	0.00 1.0000
4	0.00011849	0.00	0.00011778	0.00011931	0.00 1.0000
5	0.00000672	0.00	0.00000625	0.00000790	0.00 1.0000



- operator 1
- operator 2
- operator 3
- operator 4
- operator 5

r Busy
m
n
m

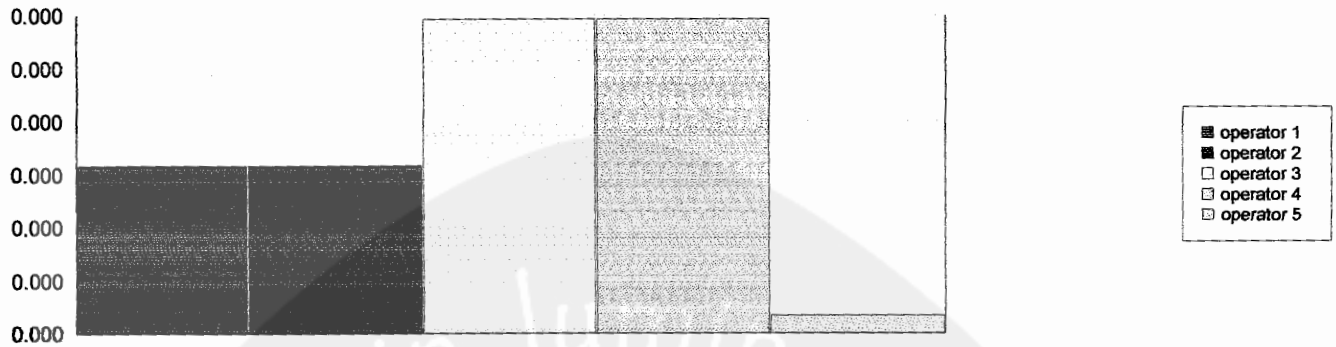
Minimum

	Average Average Value Value	Half Width	Average		
1	0.00006343	0.00	0.00006314	0.00006361	0.00 1.0000

Category Overview

January 18, 2007

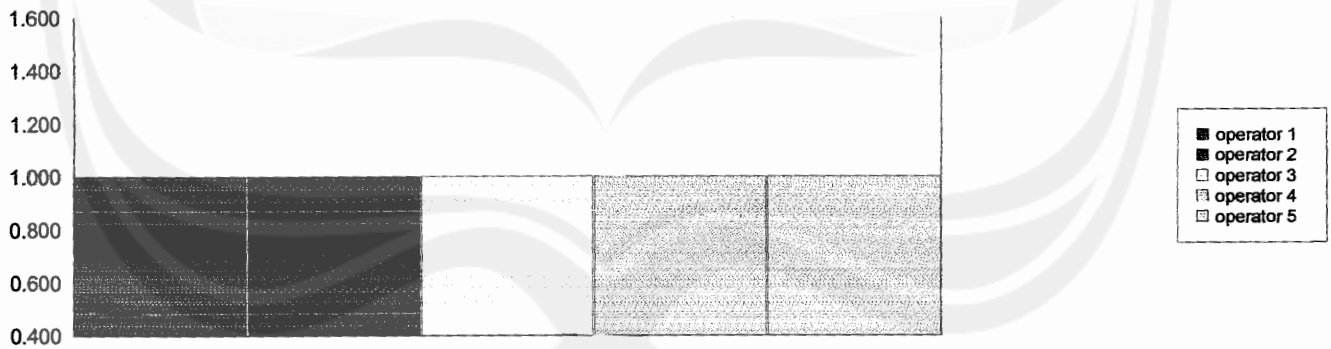
0.00006343	0.00	0.00006314	0.00006361	0.00	1.0000
0.00011849	0.00	0.00011778	0.00011931	0.00	1.0000
0.00011849	0.00	0.00011778	0.00011931	0.00	1.0000
0.00000672	0.00	0.00000625	0.00000790	0.00	1.0000



Scheduled

Minimum

	Average Average Value Value	Half Width	Average		
1	1.0000	0.00	1.0000	1.0000	1.0000
2	1.0000	0.00	1.0000	1.0000	1.0000
3	1.0000	0.00	1.0000	1.0000	1.0000
4	1.0000	0.00	1.0000	1.0000	1.0000
5	1.0000	0.00	1.0000	1.0000	1.0000



led Utilization
n

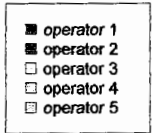
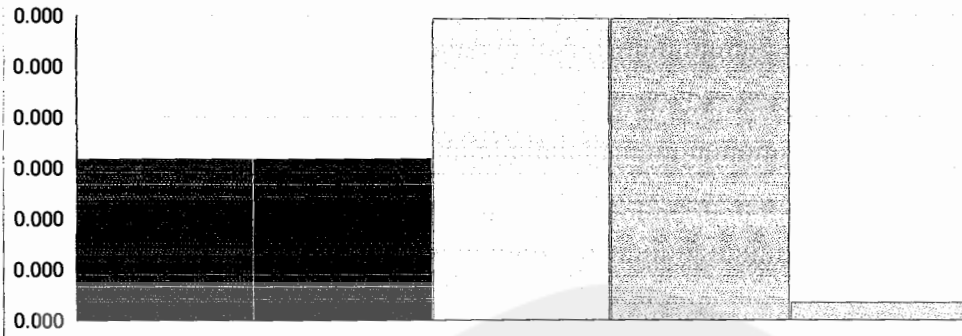
Minimum

	Average Average	Half Width	Average	
1	0.00006343	0.00	0.00006314	0.00006361
2	0.00006343	0.00	0.00006314	0.00006361
3	0.00011849	0.00	0.00011778	0.00011931
4	0.00011849	0.00	0.00011778	0.00011931
5	0.00000672	0.00	0.00000625	0.00000790

Category Overview

January 18, 2007

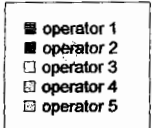
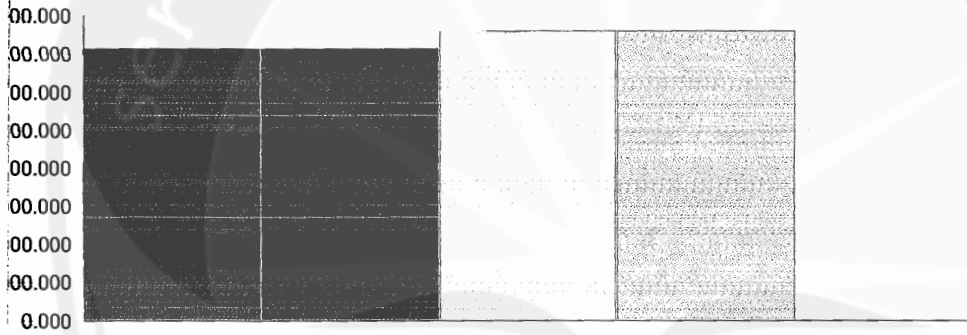
M



Number Seized

Minimum

Average Average	Half Width	Average	Average
35717.00	0.00	35717.00	35717.00
35717.00	0.00	35717.00	35717.00
37975.00	0.00	37975.00	37975.00
37975.00	0.00	37975.00	37975.00
25.0000	0.00	25.0000	25.0000



Values Across All Replications

ed Project

ons: 3

Time Units: Hours

Key Performance Indicators

stem

umber Out

Average
2,100

ne

n

ne

n

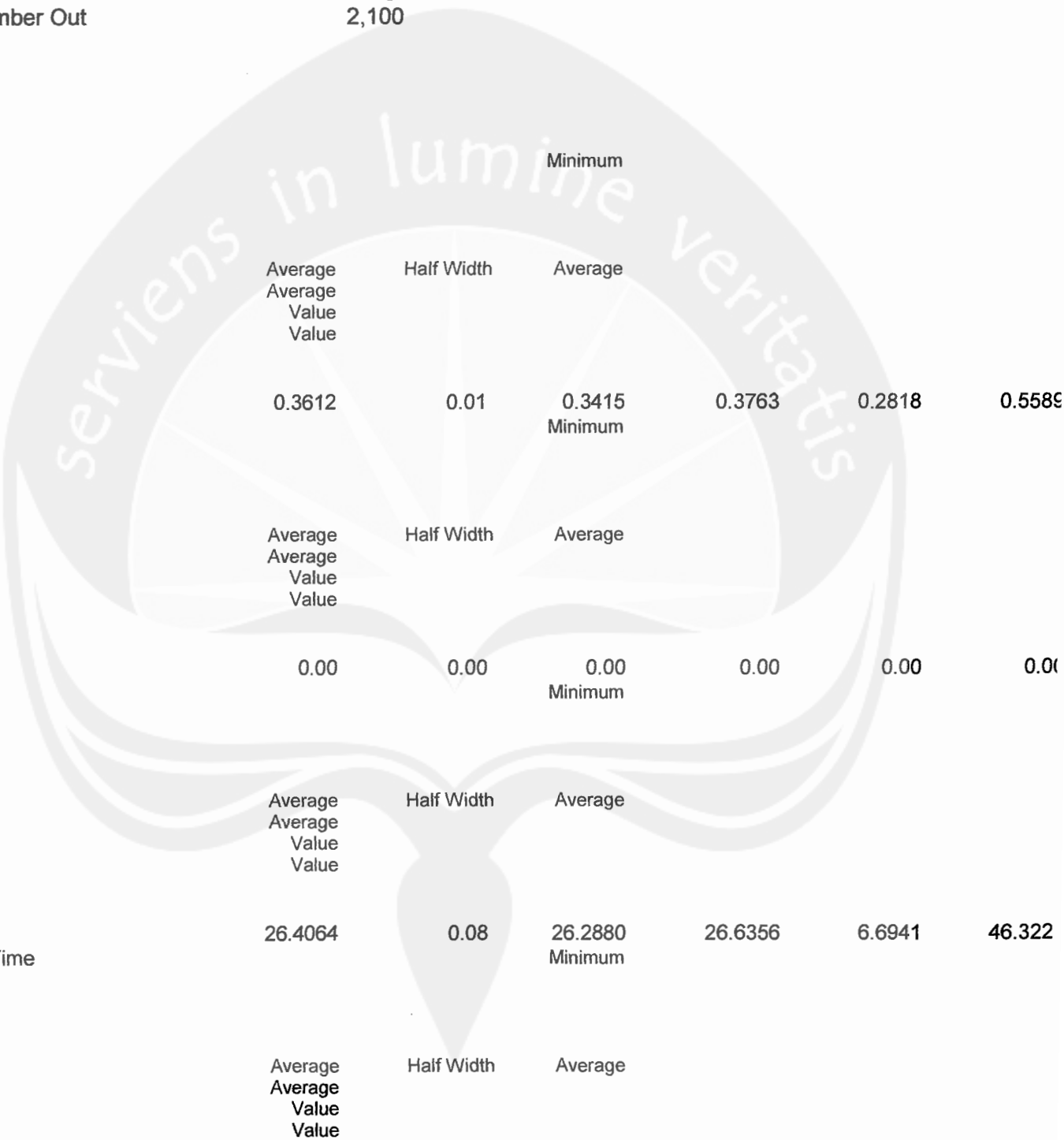
n

er Time

m

n

m



Category Overview

ne

0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Minimum				

Average Average Value Value	Half Width	Average			
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ne

0.00	0.00	0.00	0.00	0.00	0.00
		Minimum			

Average Average Value Value	Half Width	Average			
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In

9.5491	0.02	9.5041	9.6006	5.4161	13.7311
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Minimum

Average Average	Half Width	Average			
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Out

17018	0.00	17018.00	17018.00		
		Minimum			

Average Average	Half Width	Average			
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17018	0.00	17018.00	17018.00		
		Minimum			

Average Average Value Value	Half Width	Average			
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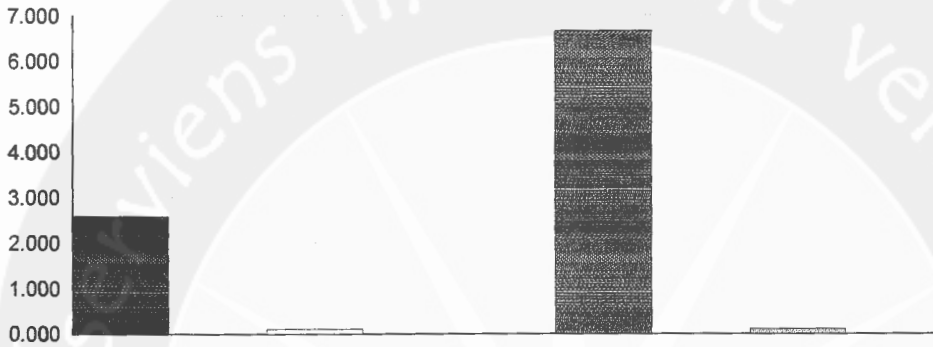
11321.40	12.94	11291.12	11347.12	0.00	16791.0
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Time
m

Minimum

Category Overview

	Average Average Value Value	Half Width	Average	Average		
Queue	2.5903	0.01	2.5740	2.6112	0.00	5.2157
Queue	0.00	0.00	0.00	0.00	0.00	0.00
Queue	0.1075	0.00	0.0976	0.1173	0.00	0.2291
Queue	0.01218694	0.00	0.01211863	0.01227503	0.00	0.02913386
Queue	0.00	0.00	0.00	0.00	0.00	0.00
Queue	6.6621	0.02	6.6184	6.6925	5.1253	8.2358
Queue	0.01123533	0.00	0.01068357	0.01194239	0.00	0.04880899
Queue	0.1089	0.00	0.1031	0.1181	0.00	0.2337
Queue	0.00005488	0.00	0.00000877	0.00014763	0.00	0.01090168



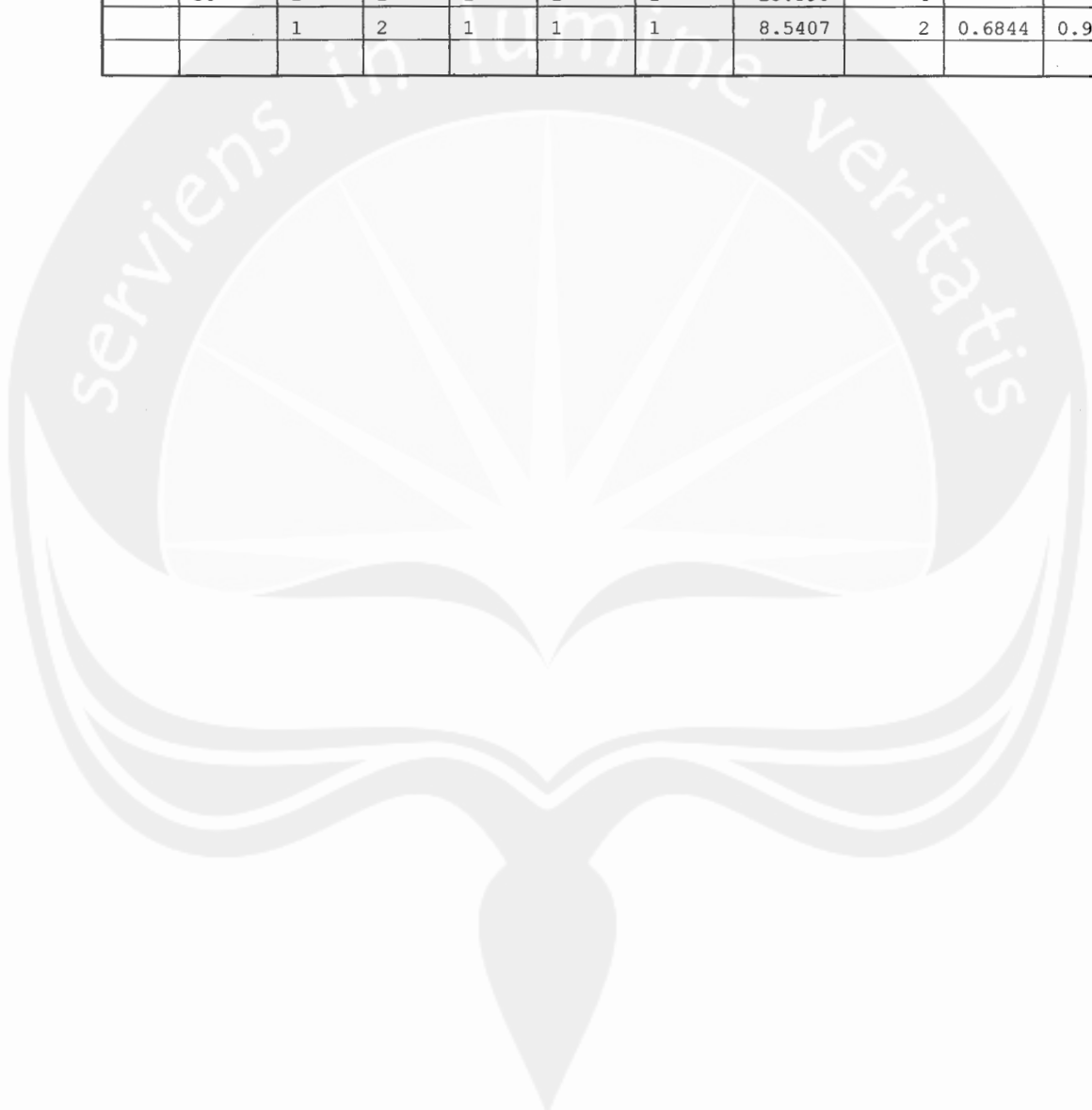
- ambul.Queue
- Batch 1.Queue
- Batch 2.Queue
- Batch 3.Queue
- Batch 4.Queue
- ijpat.Queue
- staples.Queue
- susun.Queue
- trek.Queue

Waiting
n
i
n

Minimum

	Average Average Value Value	Half Width	Average	Average		
Queue	2792.03	7.20	2779.47	2815.75	0.00	14699.0
Queue	0.00	0.00	0.00	0.00	0.00	2100.0
Queue	115.86	4.72	105.14	126.47	0.00	14700.0
Queue	13.1359	0.04	13.0233	13.2247	0.00	70.000
Queue	0.00	0.00	0.00	0.00	0.00	7.000
Queue	1025.83	2.23	1019.54	1029.84	0.00	2092.0
Queue	1.7302	0.06	1.6394	1.8433	0.00	21.000
Queue	0.05591671	0.00	0.05289780	0.06023008	0.00	6.000
Queue	0.00084546	0.00	0.00013428	0.00227411	0.00	1.000

Eks	Lembar	Susun	Ambil	Trek	Potong	Gabung	Total Time	Waktu (Hari)	Utilitas	
									op1	op2
1500	15	1	1	1	1	1	13.4509	3	1	
		1	2	1	1	1	5.1358	1	0.9522	0.8357
	20	1	1	1	1	1	17.0251	3	1	
		1	2	1	1	1	6.0734	2	0.8877	0.9405
	25	1	1	1	1	1	20.2275	4	1	
		1	2	1	1	1	7.217	2	0.7665	0.9665
	30	1	1	1	1	1	23.598	4		
		1	2	1	1	1	8.5407	2	0.6844	0.9702



Alternatif Pengalokasian Operator pada Penyusunan Buku
Tipe C

Eks	Lembar	Susun	Ambil	Trek	Staples	Lipat	Total Time	Waktu (Hari)	Utilitas		
									op1	op2	
250	5	1	1	1	1	1	2.0075	1	1		
	10	1	1	1	1	1	2.5844	1	1		
	15	1	1	1	1	1	3.5639	1	1		
	20	1	1	1	1	1	4.1408	1	1		
	25	1	1	1	1	1	5.8156	1	1		
	30	1	1	1	1	1	6.4339	2	1		
			1	1	2	1	1	4.643	1	1	0.3498
			1	1	2	1	2	4.1282	1	0.8994	0.6006
			1	1	1	1	2	5.9088	1	0.9295	0.1525
			1	2	1	1	2	4.1908	1	0.7163	0.7712
		1	2	1	2	1	4.2074	1	0.8183	0.6732	
		1	2	1	1	1	2.9153	1	0.995	0.6127	

Eks	Lembar	Susun	Ambil	Trek	Staples	Lipat	Total Time	Waktu (Hari)	Utilitas		
									op1	op2	
500	5	1	1	1	1	1	3.4454	1	1		
	10	1	1	1	1	1	4.8478	1	1		
	15	1	1	1	1	1	6.5896	2	1		
			1	2	1	1	1	3.1517	1	0.9946	0.5336
	20	1	1	1	1	1	7.6369	2	1		
			1	2	1	1	1	3.2001	1	0.9932	0.6732
	25	1	1	1	1	1	9.0114	2	1		
			1	2	1	1	1	3.3293	1	0.9931	0.785
	30	1	1	1	1	1	11.9598	2	1		
			1	2	1	1	1	4.8076	1	0.9972	0.6937

Eks	Lembar	Susun	Ambil	Trek	Staples	Lipat	Total Time	Waktu (Hari)	Utilitas	
									op1	op2
1000	5	1	1	1	1	1	6.726	2	1	
		1	2	1	1	1	4.3184	1	0.9948	0.2523
	10	1	1	1	1	1	9.3826	2	1	
		1	2	1	1	1	4.8358	1	0.9955	0.444
	15	1	1	1	1	1	12.8204	3	1	
		1	2	1	1	1	5.857	1	0.9972	0.5573
	20	1	1	1	1	1	14.7275	3	1	
		1	2	1	1	1	5.7082	1	0.9963	0.7267
	25	1	1	1	1	1	17.3606	3	1	
		1	2	1	1	1	5.8675	1	0.9963	0.8433
	30	1	1	1	1	1	22.9178	3	1	
		1	2	1	1	1	8.6269	2	0.9985	0.7398

Eks	Lembar	Susun	Ambil	Trek	Staples	Lipat	Total Time	Waktu (Hari)	Utilitas		
									op1	op2	op3
1500	5	1	1	1	1	1	10.0239	2	1		
		1	2	1	1	1	3.145	1	0.7373	0.9624	0.4351
	10	1	1	1	1	1	13.9716	3	1		
		1	2	1	1	1	7.0345	2	0.9969	0.4544	
		1	2	1	1	3	3.3442	1	0.9114	0.8469	0.9318
	15	1	1	1	1	1	18.9237	4	1		
		1	2	1	1	1	8.4867	2	0.9981	0.5712	
		1	2	1	1	3	4.5568	1	0.9456	0.9319	0.6884
	20	1	1	1	1	1	21.7176	4	1		
		1	2	1	1	1	8.1248	2	0.9975	0.7487	
	25	1	1	1	1	1	25.5688	5	1		
		1	2	1	1	1	8.3486	2	0.9975	0.8665	
	30	1	2	1	1	1	12.4868	3	0.999	0.757	
		1	2	1	1	3	9.0482	2	0.8841	0.9355	0.3437

Eks	Lembar	Susun	Ambil	Trek	Staples	Lipat	Total Time	Waktu (Hari)	Utilitas		
									op1	op2	op3
2000	5	1	1	1	1	1	13.2603	3	1		
		1	2	1	1	1	8.3986	2	0.9974	0.2566	
		1	2	1	1	3	4.1325	1	0.7265	0.9717	0.4369
	10	1	1	1	1	1	18.4412	4	1		
		1	2	1	1	1	9.2162	2	0.9977	0.4605	
		1	2	1	1	3	4.3136	1	0.9119	0.8635	0.9479
	15	1	1	1	1	1	25.0364	5	1		
		1	2	1	1	1	11.1108	2	0.9985	0.5772	
	20	1	2	1	1	1	10.5289	2	0.9981	0.7594	
	25	1	2	1	1	1	10.8374	2	0.9981	0.879	

