ANALISIS JARINGAN TRANSPORTASI MULTIMODA

DALAM PROSES DISTRIBUSI

(Studi Kasus di PT. LMN)

Skripsi

Untuk Memenuhi Sebagian Persyaratan Mencapai Derajad Sarjana S-1

Program Studi Teknik Industri

Diajukan Oleh :

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menyatakan bahwa skripsi dengan judul "*Analisis Jaringan Transportasi Multimoda dalam Proses Distribusi*" merupakan asli hasil dari penelitian yang saya lakukan dan/atau bukan hasil dari kegiatan menjiplak/meniru penelitian dari orang lain atau penelitian yang pernah dilakukan sebelumnya.

Pernyataan ini saya buat dalam keadaan sadar dan tanpa ada tekanan dari pihak manapun. Terima kasih.

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Assalamu'alaikum wr. wb.

Setelah membaca, meneliti, memberikan petunjuk dan mengoreksi serta mengadakan perbaikan seperlunya, maka kami selaku pembimbing berpendapat bahwa skripsi Saudara:

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sudah dapat diajukan kembali kepada Program Studi Teknik Industri Fakultas Sains dan Teknologi UIN Sunan Kalijaga Yogyakarta sebagai salah satu syarat untuk memperoleh gelar Sarjana Strata Satu dalam Prodi Teknik Industri.

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Assalamu'alaikum wr...wb...

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Yogyakarta, 7 Agustus 2012

Penyusun,

Budi Setiyawan

MOTTO DAN PERSEMBAHAN

Motto

Pengalaman Adalah Jalan bagi Pendewasaan Diri dan Kematangan Berpikir (MS)

”Dan bahwasannya seorang manusia tidak memperoleh selain apa yang telah diusahakannya. Dan bahwasannya usaha itu kelak akan diperlihatkan (kepadanya). Kemudian akan diberi balasan kepadanya dengan balasan yang paling sempurna.” (Q.S. An-Najm : 39-41)

Ilmu lebih baik daripada harta, karena ilmu akan menjaga kamu dan semakin berkembang jika dimanfaatkan. Sedangkan harta kamulah yang menjaganya dan akan habis bila dinafkahkan. (Ali Bin Abi Thalib RA)

Persembahan

Kupersembahkan Skripsi Ini Kepada :

1. Bapak yang selalu memberikan kekuatan dalam kehidupan ini.
2. Ibu yang selalu mendoakan, memberkati, dan memberikan semangat..
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5. Teman-teman Teknik Industri Angkatan 2008: keceriaan dan kekompakan selalu menghiasi hari-hari kita dan kebersamaan adalah adalah prioritas kita.

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ANALISIS JARINGAN TRANSPORTASI MULTIMODA

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Budi Setiyawan

ABSTRAK

Distribusi merupakan salah satu aspek penting bagi perusahaan. Karena jika distribusi bahan baku terhambat, maka terhambat pula produksi perusahaan. Disamping itu biaya distribusi merupakan biaya non added value yang paling besar bagi perusahaan. Bahkan biaya distribusi bisa melampaui biaya produksi. Oleh karena itu penting sekali bagi perusahaan untuk bisa meminimasi biaya distribusi bahan baku maupun produk jadi. Untuk meminimasi biaya distribusi kita bisa menganalisa dari beberapa aspek yang antara lain pemilihan moda transportasi yang tepat dan pemilihan rute pendistribusian barang. Penelitian ini bertujuan untuk melakukan analisa jaringan transportasi multimoda dalam proses distribusi di PT LMN. Dari hasil analisa tersebut bisa dihasilkan pemilihan moda transportasi yang terbaik bagi perusahaan dan juga penentuan rute distribusinya dengan biaya yang paling kecil. Sehingga biaya distribusi dari perusahaan dapat ditekan yang akhirnya akan berdampak pada peningkatan keuntungan dari perusahaan. Dalam melakukan analisa jaringan distribusi ini peneliti menggunakan perhitungan matematis dan model simulasi. Dari hasil perhitungan matematis dan model simulasi diperoleh hasil moda transportasi yang terbaik bagi PT. LMN adalah moda transportasi Kereta api, Dengan rata-rata kebutuhan kereta api dalam 1 bulan sebesar 16 kereta dengan biaya distribusi Rp. 2.184.800.000,00 .

Kata Kunci : Transportasi, Distribusi, Simulasi, Logistik

MUTLIMODAL TRANSPORTATION NETWORK ANALYSIS

IN DISTRIBUTION PROCESS

(Case Study in PT. LMN)

Budi Setiyawan

ABSTRACT

Distribution is one of the important aspects for the company. Because if the distribution of raw materials is hampered, it also inhibited the production company. Besides, the cost of distribution is a non greatest added value for the company. Even distribution costs can exceed the cost of production. Therefore, it is important for companies to be able to minimize the cost of raw materials and distribution of finished product. To minimize the cost of distribution we can analyze from several aspects such as the selection of the appropriate mode of transportation and distribution of goods route selection. This study aims to analyze the multimodal transportation network in the distribution process at PT LMN. From the results of this analysis can be generated selection of the best mode of transportation for the company and also the determination of the distribution route with the smallest cost. So the cost of distribution of firms can be reduced which will ultimately impact on increasing the profit of the company. In this distribution network analysis researchers used mathematical calculations and model simulations. From the results of mathematical calculations and the results obtained by the simulation models that best mode of transportation for the PT. LMN is a railway transportation, the average rail needs in 1 month by 16 trains with cost of distribution Rp. 2,184,800,000.00.

Keyword: Transportation, Distribution, Simulation, Logistic

BAB I

PENDAHULUAN

1.1 Latar Belakang

Pada era globalisasi seperti sekarang ini, dunia bisnis dipenuhi oleh persaingan yang semakin tinggi diantara para pengusaha domestik maupun para pengusaha asing di tingkat internasional. Hal ini mendorong setiap perusahaan untuk terus mencari cara menghasilkan nilai kompetitif yang lebih tinggi bagi perusahaannya. Untuk memperoleh keunggulan kompetitif tersebut, perusahaan selalu melakukan peninjauan dan pengembangan di berbagai aspek yang penting. Beberapa aspek penting yang sering ditinjau dan yang selalu dilakukan pengembangan antara lain pengembangan sistem produksi, pengembangan produk dengan melihat tingkat permintaan konsumen, hingga meninjau dari aspek kepuasan konsumen terhadap produk yang dikeluarkan.

Distribusi bahan baku juga termasuk hal yang menjadi aspek penting dalam mencapai tujuan perusahaan, karena distribusi bahan baku terkait dengan persediaan bahan baku. Keterlambatan pengiriman bahan baku dapat menimbulkan keterlambatan proses produksi, dan bila proses produksi mengalami keterlambatan maka hasil produksi yang diinginkan tidak akan maksimal. Selain distribusi bahan baku, distribusi produk jadi ke agen ataupun konsumen sangatlah penting. Karena distribusi yang terlambat sampai pada konsumen memberikan faktor yang buruk terhadap

citra perusahaan sehingga dapat menurunkan keuntungan perusahaan karena berkurangnya jumlah konsumen.

Selain keterlambatan atau dalam hal ini masalah waktu distribusi, biaya distribusi juga sangat diperhitungkan. Karena dengan pemilihan moda transportasi yang tepat dan pemilihan jalur distribusi yang cepat dapat meminimasi biaya pengadaan bahan baku maupun distribusi produk jadi dari perusahaan. Hal inilah yang saat ini dijadikan pertimbangan oleh PT. LMN. Karena pada tahun 2015, produksi barang jadi pabrik diperkirakan meningkat sebesar 133.507 ton atau sekitar 501.906 m^3 (lihat Tabel 1.1). Hal ini menunjukkan kebutuhan untuk kendaraan yang memadai jumlahnya untuk mendistribusikan produk ke lokasi gudang.

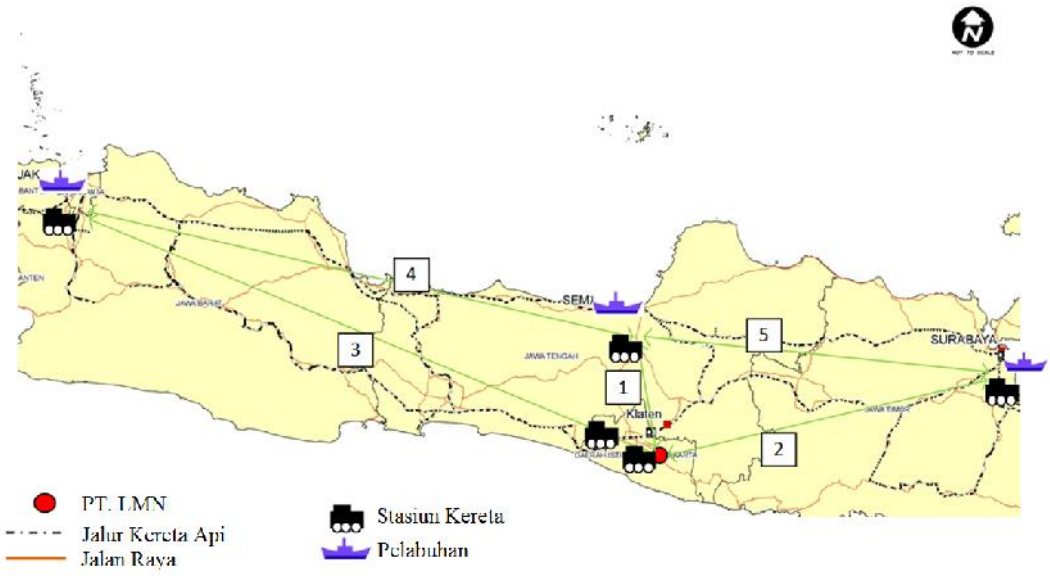
Tabel 1.1: Produk dan peramalan bahan baku dari PT.LMN

Description	2011	2012	2013	2014	2015
FiniPabriked goods (T)	**73,940**	**87,800**	**100,988**	**116,090**	**133,507**
- Yogya	15,527	18,438	21,207	24,379	28,036
- Bekasi	37,709	44,778	51,504	59,206	68,089
- Surabaya	11,091	13,170	15,148	17,414	20,026
- Lampung	9,612	11,414	13,128	15,092	17,356
FiniPabriked goods (m^3)	**277,970**	**330,075**	**379,654**	**436,429**	**501,906**
- Yogya	58,374	69,316	79,727	91,650	105,400
- Bekasi	141,765	168,338	193,624	222,579	255,972
- Surabaya	41,695	49,511	56,948	65,464	75,286
- Lampung	36,136	42,910	49,355	56,736	65,248
Raw Materials (T)	**73,940**	**87,800**	**100,988**	**116,090**	**133,507**
- From Semarang	59,891	71,118	81,800	94,033	108,141
- Local (Indonesia)	14,049	16,682	19,188	22,057	25,366

Sumber : Data Observasi

Selain itu, semua bahan baku yang digunakan di PT. LMN dikirim ke pabrik melalui truk. Lebih dari 80% bahan baku total berasal dari luar negeri, seperti Australia (10%), Eropa (35%), Selandia Baru (26%), Amerika (6%), dan negara-negara ASEAN (3%). Sisanya berasal dari lokal (19%). Barang-barang jadi dikirim ke 4 gudang utama melalui truk dengan kapasitas 30,9 m^3, yaitu: (1) Giwangan, Yogyakarta sekitar 21%, (2) Pondok Ungu (Bekasi-Jawa Barat) sekitar 51%, (3) Surabaya (Jawa Timur) sekitar 15%, dan sisanya adalah untuk Lampung (Sumatera) sekitar 13% melalui kontainer.

Permasalahannya adalah bahwa jika dalam proses distribusi ini menggunakan moda transportasi jalan, maka membutuhkan sejumlah besar truk. Oleh karena itu, PT. LMN mencoba mencari alternatif moda transportasi yang dapat mengirimkan barang jadi dan bahan baku secara efektif dan efisien. Dalam hal ini PT. LMN berencana untuk mengganti moda transportasi dari menggunakan truk ke kereta api. Karena dalam konteks Pulau Jawa, lokasi Pabrik-2 PT. LMN sangat strategis. Hal ini dapat dilihat dari gambar 1.1 yang menunjukkan posisi Pabrik-2 PT. LMN antara lokasi utama, seperti stasiun kereta api dan pelabuhan. Terdapat dua alternatif dalam pemilihan moda transportasi untuk mendistribusikan proses, yaitu: (a) menggunakan *link* 2 dan 3, dan (b) menggunakan *link* 1, 4 dan 5 secara eksklusif untuk pengiriman bahan baku dari Semarang ke Jakarta dan Surabaya.



Gambar 1.1 Peta Pabrik-2 PT. LMN dalam infrastruktur transportasi yang ada di Pulau Jawa

Oleh karena itu, pada penelitian kali ini peneliti ingin melakukan analisa pemilihan rute terbaik diantara dua alternative diatas. Dalam analisa pemilihan rute terbaik ini, peneliti menggunakan model simulasi. Adapun software simulasi yang peneliti gunakan adalah software promodel 7.5. Dengan analisa menggunakan model simulasi ini kita bisa mengetahui mana rute yang terbaik untuk PT. LMN sehingga bisa meminimasi waktu dan biaya distribusi.

1.2 Rumusan Masalah

Berdasarkan latar belakang masalah yang telah diuraikan diatas maka rumusan masalah dalam penelitian ini adalah :

Moda Transportasi apa yang merupakan pilihan terbaik untuk PT. LMN dalam mendistribusikan produk jadi, sehingga bisa meminimalkan biaya transportasi ?

1.3 Batasan Masalah

Agar pembahasan tidak meluas maka perlu diberikan batasan-batasan. Batasan-batasan dalam penulisan tugas akhir ini adalah:

1. Penelitian ini dilakukan di PT. LMN yang bergerak dalam bidang industri makanan bayi, anak dan ibu hamil.
2. Penelitian ini fokus terhadap pemilihan moda transportasi dan analisa rute terbaik dari dua alternatif rute di atas.
3. Perusahaan meminta nama perusahaannya untuk dirahasiakan.

1.4 Tujuan Penelitian

1 Menentukan moda transportasi yang terbaik bagi perusahaan untuk mendistribusikan bahan baku dan produk jadinya.

2 Menentukan volume minimal produk jadi dalam setiap pengiriman.

3 Menentukan Jalur pendistribusian yang terbaik.

1.5 Sistematika Penulisan

Agar dapat memberikan pembahasan yang jelas dan terperinci serta agar dapat melakukan analisis yang baik, maka digunakan sistematika penulisan sebagai berikut :

BAB I PENDAHULUAN

Meliputi Latar Belakang Masalah, Perumusan Masalah, Batasan Masalah, Tujuan, dan Sistematika Penulisan Laporan.

BAB II LANDASAN TEORI

Menguraikan secara ringkas mengenai teori-teori yang berkaitan dengan pembahasan masalah serta yang menjadi dasar dalam

pemecahan masalah, yaitu teori-teori tentang transportasi, simulasi, optimisasi dan lain lain.

BAB III METODOLOGI PENELITIAN

Memuat metode-metode atau tahapan-tahapan yang digunakan untuk menyelesaikan masalah dalam penelitian secara sistematik, berdasarkan teori-teori yang diuraikan pada bab II.

BAB IV PENGUMPULAN DAN PENGOLAHAN DATA

Berisikan data-data yang dikumpulkan dari hasil pengamatan langsung di lapangan dan hasil dari wawancara di lapangan, yang diperlukan untuk pemecahan masalah serta melakukan perhitungan dan analisa terhadap hasil perhitungan tersebut.

BAB V KESIMPULAN DAN SARAN

Berisikan kesimpulan yang dapat diperoleh dari hasil penelitian dan pembahasan serta saran-saran yang dapat dikemukakan yang didasarkan pada hasil penelitian yang sehubungan dengan permasalahan yang dihadapi.

BAB V

KESIMPULAN DAN SARAN

5.1. Kesimpulan

1. Moda transportasi yang terbaik bagi PT. LMN untuk mendistribusikan produk jadi adalah moda transportasi kereta api. Karena dengan menggunakan moda transportasi ini, biaya yang dibutuhkan paling minimal dari moda transportasi truk.
2. Jumlah kontainer yang di butuhkan untuk mengangkut *raw material* dari Pelabuhan Semarang ke gudang PT. LMN dari hasil perhitungan matematis adalah sebanyak 383 kontainer. Sedangan jumlah kontainer yang di butuhkan untuk mengangkut *raw material* dari Pelabuhan Semarang ke gudang PT. LMN dari hasil simulasi adalah sebanyak 384 kontainer.
3. Berdasarkan perhitungan matematis dalam menentukan jumlah kereta yang dibutuhkan untuk mengangkut produk *fast moving* ke Jakarta berjumlah 13 kereta per bulannya dan untuk mengangkut produk *fast moving* ke Surabaya berjumlah 3 kereta per bulan. Sedangkan berdasarkan hasil simulasi mengenai penentuan jumlah kereta yang dibutuhkan untuk mengangkut produk *fast moving* ke Jakarta berjumlah 14 kereta per bulannya dan untuk mengangkut produk *fast moving* ke Surabaya berjumlah 2 kereta per bulan.

4. Berdasarkan biaya transportasi yang paling minimal, Rute A (link Jakarta – Klaten – Surabaya) menjadi pilihan yang terbaik, karena total biaya transportasinya memiliki nilai yang paling kecil yaitu sebesar $Rp.$2.156.350.000,00 dari hasil perhitungan matematis dan Rp. 2.184.800.000,00 dari hasil simulasi.

5.2. Saran

1. Jika perusahaan beralih moda dari truk ke kereta api, maka sebaiknya untuk pengadaan bahan baku didatangkan dari pelabuhan Jakarta dan Surabaya untuk mengurangi kekosongan kereta ketika kembali ke Klaten.
2. Saran bagi penelitian selanjutnya adalah untuk faktor waktu dan variabel lain yang mempengaruhi proses distribusi dapat dimasukkan sebagai bahan pertimbangan dalam pengambilan keputusan pemilihan moda transportasi. Sehingga dalam pemilihan moda transpotasi untuk distribusi hasilnya akan lebih akurat.

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LAMPIRAN A

PLOT DISTRIBUSI DATA INPUT SIMULASI

Jumlah Kedatangan Bahan Baku

Auto::Fit of Distributions

distribution	rank	acceptance
Normal(1.11e+004, 1.44e+003)	100	do not reject
Lognormal(3.67e+003, 8.89, 0.204)	94.2	do not reject
Uniform(8.14e+003, 1.39e+004)	14.9	do not reject
Exponential(8.14e+003, 2.97e+003)	0.32	do not reject

goodness of fit

data points	12
estimates	maximum likelihood estimates
accuracy of fit	3.e-004
level of significance	5.e-002

summary

distribution	Kolmogorov Smirnov	Anderson Darling
Exponential	0.365	2.48
Lognormal	0.138	0.265
Normal	0.122	0.205
Uniform	0.223	1.17

detail

Exponential

minimum	=	8139.
beta	=	2970.92

Kolmogorov-Smirnov

data points	12
ks stat	0.365
alpha	5.e-002
ks stat(12,5.e-002)	0.375
p-value	6.16e-002
result	DO NOT REJECT

Anderson-Darling

data points	11
ad stat	2.48
alpha	5.e-002
ad stat(5.e-002)	2.49
p-value	5.05e-002
result	DO NOT REJECT

Lognormal

minimum =	3674.24	
mu =	8.89402	
sigma =	0.204412	
Kolmogorov-Smirnov		
data points		12
ks stat		0.138
alpha		5.e-002
ks stat(12,5.e-002)		0.375
p-value		0.953
result		DO NOT REJECT
Anderson-Darling		
data points		12
ad stat		0.265
alpha		5.e-002
ad stat(5.e-002)		2.49
p-value		0.962
result		DO NOT REJECT

Normal

mean =	11109.9	
sigma =	1443.55	
Kolmogorov-Smirnov		
data points		12
ks stat		0.122
alpha		5.e-002
ks stat(12,5.e-002)		0.375
p-value		0.984
result		DO NOT REJECT
Anderson-Darling		
data points		12
ad stat		0.205
alpha		5.e-002
ad stat(5.e-002)		2.49
p-value		0.989
result		DO NOT REJECT

Uniform

minimum =	8139.	
maximum =	13907.	
Kolmogorov-Smirnov		
data points		12
ks stat		0.223
alpha		5.e-002
ks stat(12,5.e-002)		0.375
p-value		0.52
result		DO NOT REJECT
Anderson-Darling		
data points		10
ad stat		1.17
alpha		5.e-002
ad stat(5.e-002)		2.49
p-value		0.279
result		DO NOT REJECT

Kacepatan Truk Semarang - PT. LMN

Auto::Fit of Distributions

distribution	rank	acceptance
Uniform(548, 635)	100	do not reject
Lognormal(548, 3.47, 1.02)	0.385	reject
Exponential(548, 43.1)	5.13e-002	reject

goodness of fit

data points	50
estimates	maximum likelihood estimates
accuracy of fit	3.e-004
level of significance	5.e-002

summary

distribution	Kolmogorov Smirnov	Anderson Darling
Exponential	0.206	3.33
Lognormal	0.163	2.99
Uniform	6.46e-002	0.329

detail

Exponential
- minimum = 548. [fixed]
- beta = 43.06
- Kolmogorov-Smirnov
  - data points: 50
  - ks stat: 0.206
  - alpha: 5.e-002
  - ks stat(50,5.e-002): 0.188
  - p-value: 2.45e-002
  - result: REJECT
- Anderson-Darling
  - data points: 49
  - ad stat: 3.33
  - alpha: 5.e-002
  - ad stat(5.e-002): 2.49
  - p-value: 1.87e-002
  - result: REJECT

Lognormal

minimum	=	548. [fixed]
mu	=	3.46534
sigma	=	1.01976

Kolmogorov-Smirnov

data points	50
ks stat	0.163
alpha	5.e-002
ks stat(50,5.e-002)	0.188
p-value	0.124
result	DO NOT REJECT

Anderson-Darling

data points	49
ad stat	2.99
alpha	5.e-002
ad stat(5.e-002)	2.49
p-value	2.77e-002
result	REJECT

Uniform

minimum	=	548. [fixed]
maximum	=	635.

Kolmogorov-Smirnov

data points	50
ks stat	6.46e-002
alpha	5.e-002
ks stat(50,5.e-002)	0.188
p-value	0.976
result	DO NOT REJECT

Anderson-Darling

data points	48
ad stat	0.329
alpha	5.e-002
ad stat(5.e-002)	2.49
p-value	0.915
result	DO NOT REJECT

Kecepatan Truk PT. LMN – Jakarta

Auto::Fit of Distributions

distribution	rank	acceptance
Uniform(790, 847)	100	do not reject
Lognormal(790, 3.16, 0.779)	5.12	reject

goodness of fit

data points	50
estimates	maximum likelihood estimates
accuracy of fit	3.e-004
level of significance	5.e-002

summary

distribution	Kolmogorov Smirnov	Anderson Darling
Lognormal	0.128	1.75
Uniform	6.07e-002	0.341

detail

Lognormal

minimum	=	790. [fixed]
mu	=	3.15688
sigma	=	0.778966

Kolmogorov-Smirnov

data points	50
ks stat	0.128
alpha	5.e-002
ks stat(50,5.e-002)	0.188
p-value	0.359
result	DO NOT REJECT

Anderson-Darling

data points	49
ad stat	1.75
alpha	5.e-002
ad stat(5.e-002)	2.49
p-value	0.127
result	DO NOT REJECT

Uniform

minimum	=	790. [fixed]
maximum	=	847.

Kolmogorov-Smirnov

data points	50
ks stat	6.07e-002
alpha	5.e-002
ks stat(50,5.e-002)	0.188
p-value	0.987
result	DO NOT REJECT

Anderson-Darling

data points	48
ad stat	0.341
alpha	5.e-002
ad stat(5.e-002)	2.49
p-value	0.904
result	DO NOT REJECT

Kecepatan Truk PT. LMN - Surabaya

Auto::Fit of Distributions

distribution	rank	acceptance
Uniform(699, 786)	100	do not reject
Lognormal(699, 3.61, 0.681)	24.9	do not reject
Exponential(699, 41.5)	0.399	do not reject

goodness of fit

data points	50
estimates	maximum likelihood estimates
accuracy of fit	3.e-004
level of significance	5.e-002

summary

distribution	Kolmogorov Smirnov	Anderson Darling
Exponential	0.143	4.18
Lognormal	0.136	0.991
Uniform	0.101	0.604

detail

Exponential

minimum	=	699. [fixed]
beta	=	41.54

Kolmogorov-Smirnov

data points	50
ks stat	0.143
alpha	5.e-002
ks stat(50,5.e-002)	0.188
p-value	0.234
result	DO NOT REJECT

Anderson-Darling

data points	46
ad stat	4.18
alpha	5.e-002
ad stat(5.e-002)	2.49
p-value	7.11e-003
result	REJECT

Lognormal

minimum	=	699. [fixed]
mu	=	3.60881
sigma	=	0.681232

Kolmogorov-Smirnov

data points	50
ks stat	0.136
alpha	5.e-002
ks stat(50,5.e-002)	0.188
p-value	0.287
result	DO NOT REJECT

Anderson-Darling

data points	46
ad stat	0.991
alpha	5.e-002
ad stat(5.e-002)	2.49
p-value	0.362
result	DO NOT REJECT

Uniform

minimum	=	699. [fixed]
maximum	=	786.

Kolmogorov-Smirnov

data points	50
ks stat	0.101
alpha	5.e-002
ks stat(50,5.e-002)	0.188
p-value	0.649
result	DO NOT REJECT

Anderson-Darling

data points	44
ad stat	0.604
alpha	5.e-002
ad stat(5.e-002)	2.49
p-value	0.644
result	DO NOT REJECT

Kecepatan Kereta Jogja – Jakarta

Auto::Fit of Distributions

distribution	rank	acceptance
Uniform(1.08e+003, 1.73e+003)	100	do not reject
Lognormal(1.08e+003, 5.64, 0.866)	1.02	reject

goodness of fit

data points	50
estimates	maximum likelihood estimates
accuracy of fit	3.e-004
level of significance	5.e-002

summary

distribution	Kolmogorov Smirnov	Anderson Darling
Lognormal	0.166	3.03
Uniform	0.108	0.752

detail

Lognormal
- minimum = 1083. [fixed]
- mu = 5.63589
- sigma = 0.866192
- Kolmogorov-Smirnov
  - data points: 50
  - ks stat: 0.166
  - alpha: 5.e-002
  - ks stat(50,5.e-002): 0.188
  - p-value: 0.113
  - result: DO NOT REJECT
- Anderson-Darling
  - data points: 48
  - ad stat: 3.03
  - alpha: 5.e-002
  - ad stat(5.e-002): 2.49
  - p-value: 2.65e-002
  - result: REJECT

Uniform
- minimum = 1083. [fixed]
- maximum = 1733.
- Kolmogorov-Smirnov
  - data points: 50
  - ks stat: 0.108
  - alpha: 5.e-002
  - ks stat(50,5.e-002): 0.188
  - p-value: 0.571
  - result: DO NOT REJECT
- Anderson-Darling
  - data points: 47
  - ad stat: 0.752
  - alpha: 5.e-002
  - ad stat(5.e-002): 2.49
  - p-value: 0.517
  - result: DO NOT REJECT

Kecepatan Kereta PT. LMN - Surabaya

Auto::Fit of Distributions

distribution	rank	acceptance
Uniform(900, 1.75e+003)	100	do not reject
Lognormal(900, 5.91, 0.84)	1.69	reject

goodness of fit

data points	50
estimates	maximum likelihood estimates
accuracy of fit	3.e-004
level of significance	5.e-002

summary

distribution	Kolmogorov Smirnov	Anderson Darling
Lognormal	0.161	2.33
Uniform	0.106	0.434

detail

Lognormal

minimum	=	900. [fixed]
mu	=	5.91268
sigma	=	0.839978

Kolmogorov-Smirnov

data points	50
ks stat	0.161
alpha	5.e-002
ks stat(50,5.e-002)	0.188
p-value	0.135
result	DO NOT REJECT

Anderson-Darling

data points	48
ad stat	2.33
alpha	5.e-002
ad stat(5.e-002)	2.49
p-value	6.05e-002
result	DO NOT REJECT

Uniform

minimum	=	900. [fixed]
maximum	=	1750.

Kolmogorov-Smirnov

data points	50
ks stat	0.106
alpha	5.e-002
ks stat(50,5.e-002)	0.188
p-value	0.592
result	DO NOT REJECT

Anderson-Darling

data points	45
ad stat	0.434
alpha	5.e-002
ad stat(5.e-002)	2.49
p-value	0.814
result	DO NOT REJECT

Kecepatan Kereta Semarang – Jakarta

Auto::Fit of Distributions

distribution	rank	acceptance
Uniform(850, 1.35e+003)	100	do not reject
Lognormal(850, 5.4, 0.88)	1.27	reject

goodness of fit

data points	41
estimates	maximum likelihood estimates
accuracy of fit	3.e-004
level of significance	5.e-002

summary

distribution	Kolmogorov Smirnov	Anderson Darling
Lognormal	0.212	2.8
Uniform	0.159	0.773

detail

Lognormal

minimum =	850. [fixed]
mu =	5.40212
sigma =	0.880241

Kolmogorov-Smirnov

data points	41
ks stat	0.212
alpha	5.e-002
ks stat(41,5.e-002)	0.208
p-value	4.2e-002
result	REJECT

Anderson-Darling

data points	39
ad stat	2.8
alpha	5.e-002
ad stat(5.e-002)	2.49
p-value	3.47e-002
result	REJECT

Uniform

minimum =	850. [fixed]
maximum =	1350.

Kolmogorov-Smirnov

data points	41
ks stat	0.159
alpha	5.e-002
ks stat(41,5.e-002)	0.208
p-value	0.229
result	DO NOT REJECT

Anderson-Darling

data points	36
ad stat	0.773
alpha	5.e-002
ad stat(5.e-002)	2.49
p-value	0.501
result	DO NOT REJECT

Kecepatan Kereta Semarang - Surabaya

Auto::Fit of Distributions

distribution	rank	acceptance
Uniform(833, 1.5e+003)	100	do not reject
Lognormal(833, 5.52, 0.896)	0.672	reject
Exponential(833, 325)	4.67e-002	reject

goodness of fit

data points	50
estimates	maximum likelihood estimates
accuracy of fit	3.e-004
level of significance	5.e-002

summary

distribution	Kolmogorov Smirnov	Anderson Darling
Exponential	0.213	3.11
Lognormal	0.171	2.26
Uniform	7.01e-002	0.248

detail

Exponential
- minimum = 833. [fixed]
- beta = 325.02
- Kolmogorov-Smirnov
  - data points: 50
  - ks stat: 0.213
  - alpha: 5.e-002
  - ks stat(50,5.e-002): 0.188
  - p-value: 1.79e-002
  - result: REJECT
- Anderson-Darling
  - data points: 49
  - ad stat: 3.11
  - alpha: 5.e-002
  - ad stat(5.e-002): 2.49
  - p-value: 2.42e-002
  - result: REJECT

Lognormal

minimum	=	833. [fixed]
mu	=	5.51948
sigma	=	0.896466

Kolmogorov-Smirnov

data points	50
ks stat	0.171
alpha	5.e-002
ks stat(50,5.e-002)	0.188
p-value	9.36e-002
result	DO NOT REJECT

Anderson-Darling

data points	49
ad stat	2.26
alpha	5.e-002
ad stat(5.e-002)	2.49
p-value	6.64e-002
result	DO NOT REJECT

Uniform

minimum	=	833. [fixed]
maximum	=	1500.

Kolmogorov-Smirnov

data points	50
ks stat	7.01e-002
alpha	5.e-002
ks stat(50,5.e-002)	0.188
p-value	0.952
result	DO NOT REJECT

Anderson-Darling

data points	48
ad stat	0.248
alpha	5.e-002
ad stat(5.e-002)	2.49
p-value	0.971
result	DO NOT REJECT

LAMPIRAN B

MODEL DAN SOURCE CODE SIMULASI PROMODEL

Model Sistem Nyata

Desain Model

INPUT DATA

Location

Locations

Icon	Name	Cap.	Units	DTs...	Stats	Rules...
	WH_LMN	50000	1	None	Time Series	Oldest
	WH_Jakarta	50000	1	None	Time Series	Oldest
	WH_Semarang	50000	1	None	Time Series	Oldest
	WH_Surabaya	50000	1	None	Time Series	Oldest
	Order_JGJ	INFINITE	1	None	Time Series	Oldest
	Order_JKT	INFINITE	1	None	Time Series	Oldest
	Order_SBY	INFINITE	1	None	Time Series	Oldest
	Factory	50000	1	None	Time Series	Oldest
	Jogja	50000	1	None	Time Series	Oldest

Entities

Entities

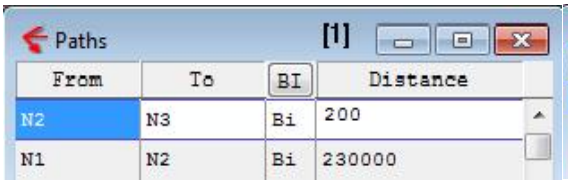
Icon	Name	Speed (mpm)	Stats
	Product_1	2500	Time Series
	Consumtion_order	1500	Time Series
	Kontainer	50	Time Series
	Kontainer2	50	Time Series

Path Network

Path Networks

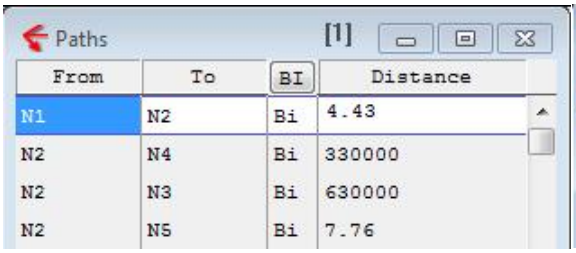
Graphic...	Name	Type	D/S	Paths...	Interfaces...	Mapping...	Nodes
	Raw	Passing	Speed & Distance	2	3	0	3
	Product	Passing	Speed & Distance	4	5	4	5

Path 1

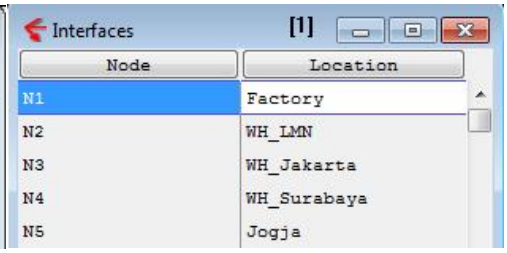


Interface 1

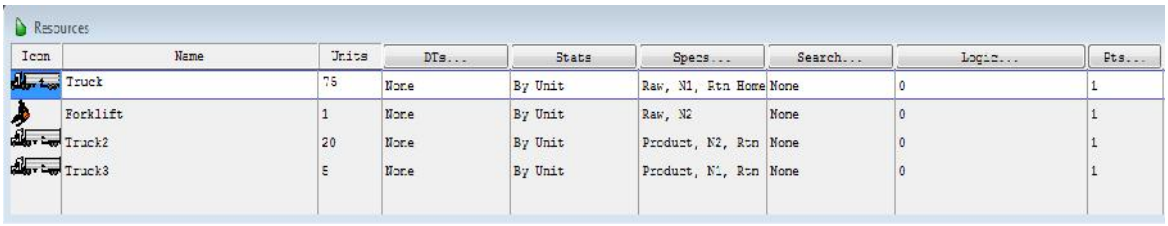
Path 2



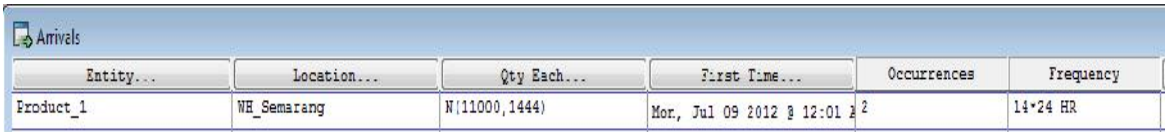
Interface 2



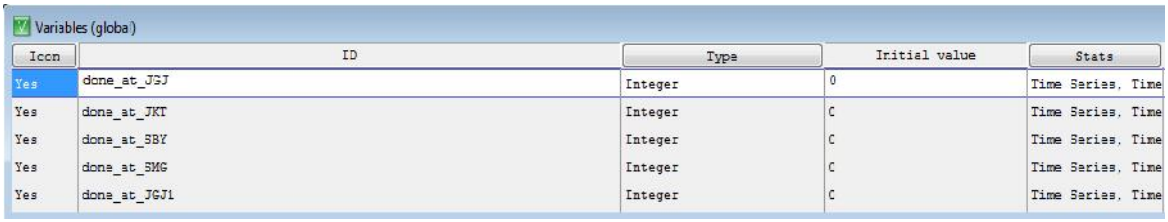
Resource



Arrival



Variabel Global



Processing

Entity	Location	Operation	Output	Destination	Rule	Move Logic
Product_1	WH _Semarang	INC done_at_SMG accum 58 group 58 as Kontainer				
Product_1	WH_LMN	wait 3 hr	Product_1	Factory	FIRST 1	move with

Entity	Location	Operation	Output	Destination	Rule	Move Logic
		dec done_at_JGJ				Forklift then free
Product_1	Factory	wait 1 hr inc done_at_JGJ1	Consumtion _order	WH_LMN	FIRST 1	MOVE for 0
Kontainer2	WH_LMN		Kontainer2	WH _Jakarta	0.3375001	MOVE WITH Truck2 THEN FREE
						INC done_at_ JKT,58
						dec done_at_ JGJ1,58
			Kontainer2	WH _Surabaya	0.09	MOVE WITH Truck3 THEN FREE
						INC done_at_ SBY,58
						dec done_at_ JGJ1,58
			Kontainer2	Jogja	0.5725	MOVE for 1
						dec done_at_ JGJ1,58
Consumtion _order	WH _Jakarta		Consumtion _order	EXIT	FIRST 1	
Consumtion _order	WH _Surabaya		Consumtion _order	EXIT	FIRST 1	
Kontainer	WH _Semarang	Wait 24*3 hr	Kontainer	WH_LMN	FIRST 1	Move with Truck then free
						inc done_at_ JGJ,58
						dec done_at_ SMG,58
Kontainer	WH_LMN	ungroup				
Consumtion _order	WH_LMN	accum 58 group 58 as Kontainer2				
Kontainer2	WH _Jakarta	ungroup				
Kontainer2	WH _Surabaya	ungroup				

Entity	Location	Operation	Output	Destination	Rule	Move Logic
Consumtion_order	WH_Jakarta	wait 24 hr	Consumtion_order	EXIT	FIRST 1	
Consumtion_order	WH_Surabaya	wait 24 hr	Consumtion_order	EXIT	FIRST 1	
Kontainer2	Jogja		Kontainer2	EXIT	FIRST 1	

Model simulasi sistem Pengembangan Rute A

Resource

Locations

Icon	Name	Cap.	Units	DTs...	Stats	Rules...
	WH_Jakarta	50000	1	None	Time Series	Oldest
	WH_Semarang	50000	1	None	Time Series	Oldest
	WH_Surabaya	50000	1	None	Time Series	Oldest
	Order_JGJ	INFINITE	1	None	Time Series	Oldest
	Order_JKT	INFINITE	1	None	Time Series	Oldest
	Order_SBY	INFINITE	1	None	Time Series	Oldest
	Factory	20000	1	None	Time Series	Oldest
	sta_prambanan	20000	1	None	Time Series	Oldest
	sta_jakarta	20000	1	None	Time Series	Oldest
	sta_kalimas	20000	1	None	Time Series	Oldest
	Jogja	20000	1	None	Time Series	Oldest

Entity

Entities

Icon	Name	Speed (mpm)	Stats
	Product_1	2500	Time Series
	Consumtion_order	1500	Time Series
	Kontainer	50	Time Series
	Kontainer2	50	Time Series
	Gerbong	50	Time Series

Path Network

Path Networks

Graphic...	Name	Type	T/S	Paths...	Interfaces...	Mapping...	Nodes
	Raw	Passing	Speed & Distance	2	3	0	3
	Product	Passing	Speed & Distance	7	8	6	3

Path 1

Paths [1]

From	To	Bi	Distance
N2	N3	Bi	200
N1	N2	Bi	230000

Interface 1

Interfaces [1]

Node	Location
N1	WH_Semarang
N2	WH_LMN
N3	Factory

Path 2

Interfaces [1]

Node	Location
N1	Factory
N2	WH_LMN
N3	sta_prambanan
N4	sta_jakarta
N5	sta_kalimas
N6	WH_Jakarta
N7	WH_Surabaya
N8	Jogja

Interface 2

Interfaces [1]

Node	Location
N1	Factory
N2	WH_LMN
N3	sta_prambanan
N4	sta_jakarta
N5	sta_kalimas
N6	WH_Jakarta
N7	WH_Surabaya
N8	Jogja

Resource

Resources

Icon	Name	Units	DTs...	Stats	Specs...	Search...	Logic...
	Truck	100	None	By Unit	Raw, N1, Rtn Home	None	C
	Forklift	1	None	By Unit	Raw, N2	None	C
	Truck2	20	None	By Unit	Product, N2, Rtn	None	C
	Rail	10	None	By Unit	Product, N2, Rtn	None	C
	Truck3	5	None	By Unit	Product, N5, Rtn	None	C
	Truck4	5	None	By Unit	Product, N7, Rtn	None	C
	Rail2	1	None	By Unit	Product, N2, Rtn	None	C

Arrival

Arrivals

Entity...	Location...	Qty Each...	First Time...	Occurrences	Frequency
Product_1	WH_Semarang	N(1100C,1444)	Mon, Jul 09 2012 @ 12:01 A	2	14*24 HR

Variabel Global

Variables (globa)

Icon	ID	Type	Initial value	Stats
Yes	done_at_JGJ	Integer	C	Time Series, Time
Yes	done_at_JKT	Integer	0	Time Series, Time
Yes	done_at_SBY	Integer	0	Time Series, Time
Yes	done_at_SMG	Integer	0	Time Series, Time
Yes	done_at_JGJ1	Integer	0	Time Series, Time

Processing

Entity	Location	Operation	Output	Destination	Rule	Move Logic
Product_1	WH_ Semarang	INC done_at_SMG accum 58 group 58 as Kontainer				
Product_1	WH_LMN		Product_1	Factory	FIRST 1	move with Forklift then free dec done_ at_JGJ
Product_1	Factory		Consumtion _order	WH_LMN	FIRST 1	MOVE for 1 inc done_ at_JGJ1
Kontainer2	WH_LMN		Kontainer2	sta_ prambanan	FIRST 1	MOVE WITH Truck2 THEN FREE dec done_at_ GJ1,58
Consumtion _order	WH _Jakarta		Consumtion _order	EXIT	FIRST 1	
Consumtion _order	WH_ Surabaya		Consumtion _order	EXIT	FIRST 1	
Kontainer	WH_ Semarang		Kontainer	WH_LMN	FIRST 1	Move with Truck then free inc done_at_ JGJ,58 dec done_at_ SMG,58
Kontainer	WH_LMN	ungroup				
Consumtion _order	WH_LMN	accum 58 group 58 as Kontainer2				
Kontainer2	WH _Jakarta	ungroup				
Kontainer2	WH _Surabaya	ungroup				
Gerbong	Sta_ prambanan	Gerbong	Gerbong	sta_ jakarta	0.3300001	MOVE WITH Rail THEN FREE
			Gerbong	sta_ kalimas	0.0975	MOVE WITH Rail2 THEN FREE

Entity	Location	Operation	Output	Destination	Rule	Move Logic
			Gerbong	Jogja	0.5725	MOVE for 1
Kontainer2	Sta_ prambanan	accum 10 group 10 as Gerbong				
Gerbong	Sta _jakarta	ungroup				
Gerbong	Sta _kalimas	ungroup				
Kontainer2	Sta _jakarta		Kontainer2	WH_ Jakarta	FIRST 1	move with Truck3 then free inc done_at_J KT,58
Kontainer2	Sta _kalimas		Kontainer2	WH_ Surabaya	FIRST 1	move with Truck4 then free inc done_at_ SBY,58
Gerbong	Jogja		Gerbong	EXIT	FIRST 1	

Model Simulasi Sistem Pengembangan Rute B

Location

Locations

Icon	Name	Cap.	Units	Dis...	Stats	Rules...
	WH_LMN	50000	1	None	Time Series	Oldest
	WH_Jakarta	50000	1	None	Time Series	Oldest
	WH_Semarang	50000	1	None	Time Series	Oldest
	WH_Surabaya	50000	1	None	Time Series	Oldest
	Order_JGJ	INFINITE	1	None	Time Series	Oldest
	Order_JKT	INFINITE	1	None	Time Series	Oldest
	Order_SBY	INFINITE	1	None	Time Series	Oldest
	Factory	20000	1	None	Time Series	Oldest
	sta_Semarang	20000	1	None	Time Series	Oldest
	sta_jakarta	20000	1	None	Time Series	Oldest
	sta_kalimas	20000	1	None	Time Series	Oldest
	Jogja	20000	1	None	Time Series	Oldest

Entity

Entities

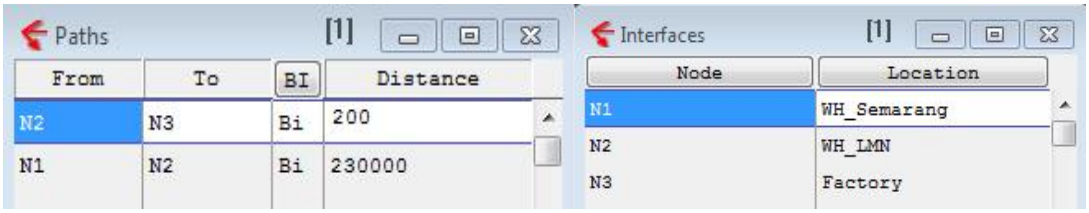
Icon	Name	Speed (mpm)	Stats
	Product_1	2500	Time Series
	Consumtion_order	1800	Time Series
	Kontainer	50	Time Series
	Kontainer2	50	Time Series
	Gerbong	50	Time Series

Path Network

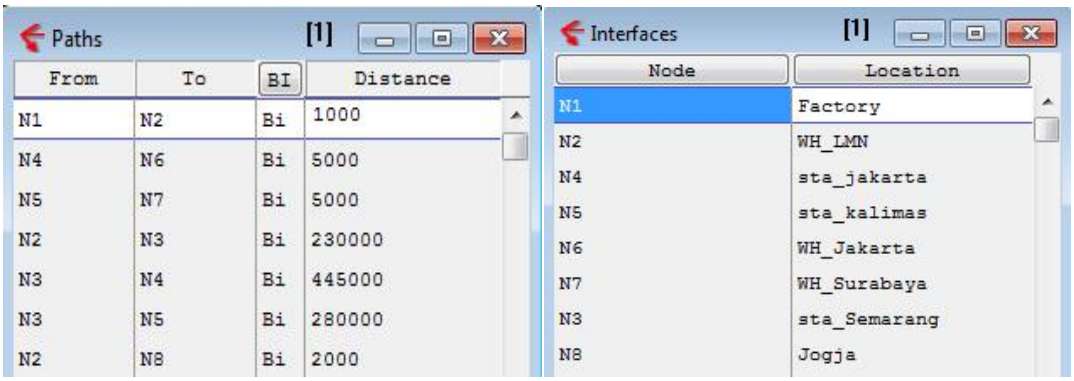
Path Networks [2]

Graphic...	Name	Type	I/S	Paths...	Interfaces...	Mapping...
	Raw	Passing	Speed & Distance	2	3	0
	Product	Passing	Speed & Distance	7	3	6

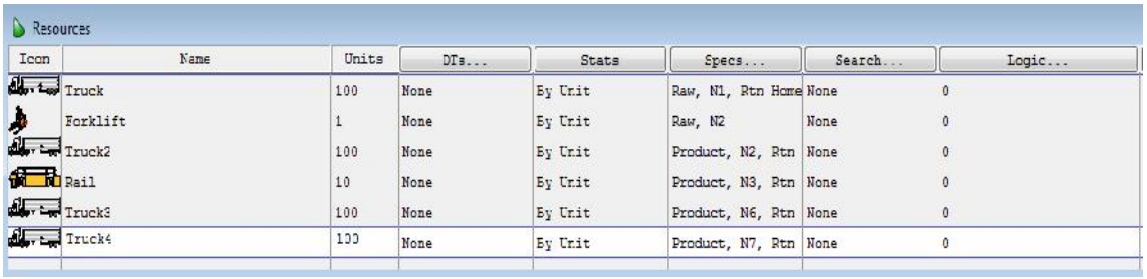
Path 1



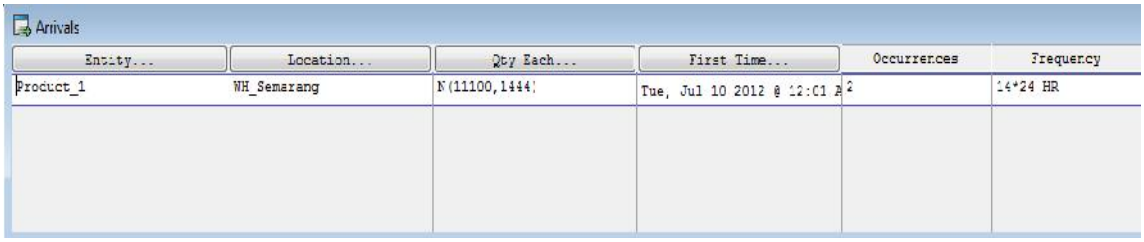
Path 2



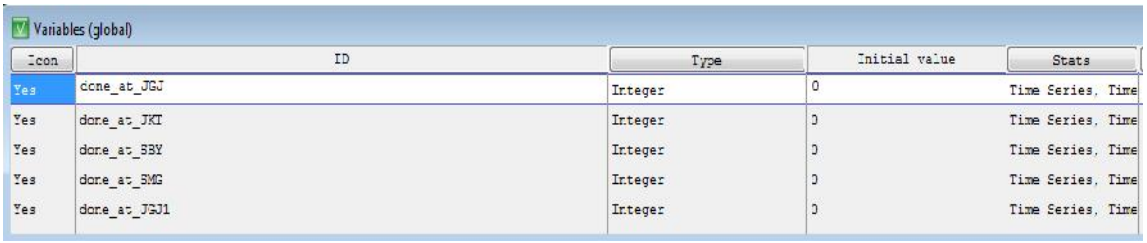
Resource



Arrival



Variabel Global



Processing

Entity	Location	Operation	Output	Destination	Rule	Move Logic
Product_1	WH_ Semarang	INC done_at_SMG				
		accum 58				
		group 58				
		as Kontainer				
Product_1	WH_LMN		Product_1	Factory	FIRST 1	move with Forklift then free
						dec done_ at_JGJ
Product_1	Factory		Consumtion _order	WH_LMN	FIRST 1	MOVE for 0
						inc done_ at_JGJ1
Kontainer2	WH_LMN		Kontainer2	sta_ Semarang	0.4750001	MOVE WITH Truck2 THEN FREE
						dec done_at_ JGJ1,58
			Kontainer2	Jogja	0.525	MOVE WITH Truck2 THEN FREE
						dec done_at_ JGJ1,58
Consumtion _order	WH_ Jakarta		Consumtion _order	EXIT	FIRST 1	
Consumtion _order	WH_ Surabaya		Consumtion _order	EXIT	FIRST 1	
Kontainer	WH_ Semarang		Kontainer	WH_LMN	FIRST 1	Move with Truck then free
						inc done_at_ JGJ,58
						dec done_at_ SMG,58
Kontainer	WH_LMN	ungroup				
Consumtion _order	WH_LMN	accum 58				
		group 58				
		as Kontainer2				
Kontainer2	WH_ Jakarta	ungroup				
Kontainer2	WH_	ungroup				

Entity	Location	Operation	Output	Destination	Rule	Move Logic
	Surabaya					
Gerbong	sta_ Semarang		Gerbong	sta_ jakarta	0.7700001	MOVE WITH Rail THEN FREE
			Gerbong	sta_ kalimas	0.23	MOVE WITH Rail2 THEN FREE
Kontainer2	sta_ Semarang	accum 10 group 10 as Gerbong				
Gerbong	sta_ jakarta	ungroup				
Gerbong	sta_ kalimas	ungroup				
Kontainer2	sta_ jakarta		Kontainer2	WH_ Jakarta	FIRST 1	move with Truck3 then free inc done_at_ JKT,58
Kontainer2	sta_ kalimas		Kontainer2	WH_ Surabaya	FIRST 1	move with Truck4 then free inc done_at_ SBY, 58
Kontainer2	Jogja		Kontainer2	EXIT	FIRST 1	

LAMPIRAN C

OUTPUT SIMULASI PROMODEL

1 REPLIKASI

Model simulasi Sistem Nyata Perusahaan

Resource

Name	Units	Scheduled Time (DAY)	Number Times Used	Avg Time Per Usage (HR)	Avg Time Travel To Use (HR)	Avg Time Travel To Park (HR)	% Blocked In Travel	% Utilization
Truck.1	1	92	5	4.19	2.05	3.44	0	1.4115036
Truck.2	1	92	5	4.07	1.74	3.21	0	1.3152174
Truck.3	1	92	5	4	1.85	3.12	0	1.3247736
Truck.4	1	92	6	3.59	2.15	3.22	0	1.5578351
Truck.5	1	92	5	4.19	2.05	3.1	0	1.4125
Truck.6	1	92	5	3.55	2.02	3.24	0	1.2603714
Truck.7	1	92	5	3.85	1.95	3.12	0	1.3147192
Truck.8	1	92	5	4.21	1.79	2.73	0	1.3591033
Truck.9	1	92	5	4.15	1.85	2.72	0	1.3586051
Truck.10	1	92	7	3.63	2.05	3.2	0	1.7997736
Truck.11	1	92	5	4	2.07	2.82	0	1.3756793
Truck.12	1	92	5	3.52	1.92	2.92	0	1.2321558
Truck.13	1	92	6	3.39	2.06	2.85	0	1.4791214
Truck.14	1	92	5	4.15	1.85	2.66	0	1.3579257
Truck.15	1	92	5	3.69	1.92	3.34	0	1.2702899
Truck.16	1	92	5	4.4	1.88	2.75	0	1.4219203
Truck.17	1	92	5	3.56	1.85	2.81	0	1.2263134
Truck.18	1	92	5	3.71	1.93	3.42	0	1.2775815
Truck.19	1	92	5	3.83	1.7	2.92	0	1.2531703
Truck.20	1	92	5	4.07	1.84	2.84	0	1.3380435
Truck.21	1	92	5	3.64	1.97	3.34	0	1.2706975
Truck.22	1	92	5	3.94	1.68	3.08	0	1.2743659
Truck.23	1	92	5	4.16	1.63	2.69	0	1.310779
Truck.24	1	92	6	3.79	2.05	2.87	0	1.5844656
Truck.25	1	92	6	3.55	2.03	3.44	0	1.5166214
Truck.26	1	92	5	3.86	1.78	3.3	0	1.2790761
Truck.27	1	92	5	3.76	2.09	3.12	0	1.3263134
Truck.28	1	92	5	4.2	1.89	3.28	0	1.3779438
Truck.29	1	92	6	3.55	2.05	2.83	0	1.5219656
Truck.30	1	92	5	3.92	1.7	3.23	0	1.2708333
Truck.31	1	92	5	4.05	1.94	2.63	0	1.3560236
Truck.32	1	92	5	3.79	1.75	3.01	0	1.2560236
Truck.33	1	92	5	4.03	2.03	3.59	0	1.3736866
Truck.34	1	92	5	4.03	2.07	2.89	0	1.3815217
Truck.35	1	92	5	3.65	1.94	3.25	0	1.267346
Truck.36	1	92	5	3.7	1.89	3.2	0	1.267029
Truck.37	1	92	5	3.89	1.97	3.11	0	1.3261322

Name	Units	Scheduled Time (DAY)	Number Times Used	Avg Time Per Usage (HR)	Avg Time Travel To Use (HR)	Avg Time Travel To Park (HR)	% Blocked In Travel	% Utilization
Truck.38	1	92	5	3.58	1.96	3.29	0	1.255163
Truck.39	1	92	5	3.75	1.99	2.97	0	1.299683
Truck.40	1	92	5	4.09	1.84	3.08	0	1.3437047
Truck.41	1	92	5	3.42	1.89	3.28	0	1.2021739
Truck.42	1	92	5	3.6	1.98	2.87	0	1.2632246
Truck.43	1	92	5	3.76	1.79	3.56	0	1.2575181
Truck.44	1	92	5	3.45	1.98	3.24	0	1.2303895
Truck.45	1	92	5	3.78	2.05	3.1	0	1.3197917
Truck.46	1	92	5	4.11	1.74	2.88	0	1.3231431
Truck.47	1	92	5	4.38	1.63	3.21	0	1.3627717
Truck.48	1	92	5	3.97	1.93	3.38	0	1.3371377
Truck.49	1	92	6	3.65	2	3.21	0	1.5369112
Truck.50	1	92	5	3.53	1.78	3.01	0	1.2021739
Truck.51	1	92	5	4.35	1.81	3.08	0	1.3959239
Truck.52	1	92	5	4.16	1.61	2.69	0	1.3056612
Truck.53	1	92	5	3.63	1.74	3.3	0	1.217029
Truck.54	1	92	5	3.96	2.05	3.2	0	1.3609149
Truck.55	1	92	6	3.64	1.99	2.62	0	1.5310236
Truck.56	1	92	5	3.68	1.8	3.13	0	1.2415308
Truck.57	1	92	5	3.9	2.07	2.99	0	1.3528533
Truck.58	1	92	5	4.09	1.86	3.01	0	1.3463768
Truck.59	1	92	5	4.16	1.73	3.11	0	1.3331069
Truck.60	1	92	5	4.07	2.17	2.89	0	1.4131793
Truck.61	1	92	5	3.95	1.67	3.68	0	1.2737772
Truck.62	1	92	5	4.21	1.89	3.01	0	1.3826087
Truck.63	1	92	5	3.93	1.81	3.25	0	1.2997283
Truck.64	1	92	5	3.77	1.91	3.29	0	1.2861413
Truck.65	1	92	5	4.1	2.08	2.93	0	1.4013134
Truck.66	1	92	5	4.32	1.81	3.36	0	1.3886322
Truck.67	1	92	5	4.62	1.94	3.45	0	1.4850996
Truck.68	1	92	5	3.96	1.72	3.2	0	1.2857337
Truck.69	1	92	5	3.52	1.75	3.08	0	1.192346
Truck.70	1	92	5	3.84	1.92	3.43	0	1.3032609
Truck.71	1	92	5	3.91	2	2.84	0	1.3381793
Truck.72	1	92	5	3.99	1.93	3.06	0	1.3409873
Truck.73	1	92	5	3.9	2.02	3.37	0	1.3408514
Truck.74	1	92	5	3.86	2.01	3.09	0	1.3298913
Truck.75	1	92	5	3.9	1.76	2.64	0	1.2820652
Truck	75	6900	384	3.88	1.91	3.09	0	1.3422591
Forklift	1	92	22272	0.01	0	0	0	10.086775

Name	Units	Scheduled Time (DAY)	Number Times Used	Avg Time Per Usage (HR)	Avg Time Travel To Use (HR)	Avg Time Travel To Park (HR)	% Blocked In Travel	% Utilization
Truck2.1	1	92	12	10.22	0	8.6	0	5.5543478
Truck2.2	1	92	12	10.16	0	8.06	0	5.5221014
Truck2.3	1	92	11	10.92	0	8.53	0	5.4386775
Truck2.4	1	92	12	10.2	0	8.88	0	5.5428895
Truck2.5	1	92	10	10.02	0	8.02	0	4.5394928
Truck2.6	1	92	10	10.09	0	8.34	0	4.5711051
Truck2.7	1	92	10	10.96	0	8.74	0	4.9627264
Truck2.8	1	92	9	10.62	0	8.77	0	4.3289402
Truck2.9	1	92	9	11.78	0	9.29	0	4.801087
Truck2.10	1	92	8	11.14	0	7.74	0	4.036096
Truck2.11	1	92	8	10.73	0	7.83	0	3.8894022
Truck2.12	1	92	6	10.59	0	8.12	0	2.878125
Truck2.13	1	92	4	10.32	0	8.24	0	1.8687953
Truck2.14	1	92	2	10.08	0	8.29	0	0.9128623
Truck2.15	1	92	2	10.9	0	8.63	0	0.9877717
Truck2.16	1	92	2	10.16	0	7.25	0	0.9201993
Truck2.17	1	92	1	9.79	0	8.42	0	0.443433
Truck2.18	1	92	0	0	0	0	0	0
Truck2.19	1	92	0	0	0	0	0	0
Truck2.20	1	92	0	0	0	0	0	0
Truck2	20	1840	128	10.56	0	8.41	0	3.0599026
Truck3.1	1	92	13	5.51	0	4.7	0	3.2467844
Truck3.2	1	92	11	5.88	0	4.26	0	2.9299366
Truck3.3	1	92	6	6.16	0	4.54	0	1.6732337
Truck3.4	1	92	3	5.32	0	4.78	0	0.7228261
Truck3.5	1	92	1	5	0	5.01	0	0.2265399
Truck3	5	460	34	5.71	0	4.55	0	1.7598641

Resource Cost

Name	Units	NonUse Cost Dollars	% NonUse Cost	Usage Cost Dollars	% Usage Cost	Total Cost Dollars	% Total Cost
Truck.1	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.2	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.3	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.4	1	0	0	20700000	0.776939534	20700000	0.776939534
Truck.5	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.6	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.7	1	0	0	17250000	0.647449612	17250000	0.647449612

Name	Units	NonUse Cost Dollars	% NonUse Cost	Usage Cost Dollars	% Usage Cost	Total Cost Dollars	% Total Cost
Truck.8	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.9	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.10	1	0	0	24150000	0.906429456	24150000	0.906429456
Truck.11	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.12	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.13	1	0	0	20700000	0.776939534	20700000	0.776939534
Truck.14	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.15	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.16	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.17	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.18	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.19	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.20	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.21	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.22	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.23	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.24	1	0	0	20700000	0.776939534	20700000	0.776939534
Truck.25	1	0	0	20700000	0.776939534	20700000	0.776939534
Truck.26	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.27	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.28	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.29	1	0	0	20700000	0.776939534	20700000	0.776939534
Truck.30	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.31	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.32	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.33	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.34	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.35	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.36	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.37	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.38	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.39	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.40	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.41	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.42	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.43	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.44	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.45	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.46	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.47	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.48	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.49	1	0	0	20700000	0.776939534	20700000	0.776939534

Name	Units	NonUse Cost Dollars	% NonUse Cost	Usage Cost Dollars	% Usage Cost	Total Cost Dollars	% Total Cost
Truck.50	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.51	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.52	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.53	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.54	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.55	1	0	0	20700000	0.776939534	20700000	0.776939534
Truck.56	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.57	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.58	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.59	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.60	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.61	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.62	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.63	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.64	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.65	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.66	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.67	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.68	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.69	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.70	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.71	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.72	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.73	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.74	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck.75	1	0	0	17250000	0.647449612	17250000	0.647449612
Truck	75	0	0	1324800000	49.72413017	1324800000	49.72413017
Forklift	1	0	0	0	0	0	0
Truck2.1	1	0	0	109800000	4.121157527	109800000	4.121157527
Truck2.2	1	0	0	109800000	4.121157527	109800000	4.121157527
Truck2.3	1	0	0	100650000	3.777727733	100650000	3.777727733
Truck2.4	1	0	0	109800000	4.121157527	109800000	4.121157527
Truck2.5	1	0	0	91500000	3.434297939	91500000	3.434297939
Truck2.6	1	0	0	91500000	3.434297939	91500000	3.434297939
Truck2.7	1	0	0	91500000	3.434297939	91500000	3.434297939
Truck2.8	1	0	0	82350000	3.090868145	82350000	3.090868145
Truck2.9	1	0	0	82350000	3.090868145	82350000	3.090868145
Truck2.10	1	0	0	73200000	2.747438352	73200000	2.747438352
Truck2.11	1	0	0	73200000	2.747438352	73200000	2.747438352
Truck2.12	1	0	0	54900000	2.060578764	54900000	2.060578764
Truck2.13	1	0	0	36600000	1.373719176	36600000	1.373719176
Truck2.14	1	0	0	18300000	0.686859588	18300000	0.686859588

Name	Units	NonUse Cost Dollars	% NonUse Cost	Usage Cost Dollars	% Usage Cost	Total Cost Dollars	% Total Cost
Truck2.15	1	0	0	18300000	0.686859588	18300000	0.686859588
Truck2.16	1	0	0	18300000	0.686859588	18300000	0.686859588
Truck2.17	1	0	0	9150000	0.343429794	9150000	0.343429794
Truck2.18	1	0	0	0	0	0	0
Truck2.19	1	0	0	0	0	0	0
Truck2.20	1	0	0	0	0	0	0
Truck2	20	0	0	1171200000	43.95901362	1171200000	43.95901362
Truck3.1	1	0	0	64350000	2.415268551	64350000	2.415268551
Truck3.2	1	0	0	54450000	2.043688774	54450000	2.043688774
Truck3.3	1	0	0	29700000	1.114739331	29700000	1.114739331
Truck3.4	1	0	0	14850000	0.557369666	14850000	0.557369666
Truck3.5	1	0	0	4950000	0.185789889	4950000	0.185789889
Truck3	5	0	0	168300000	6.31685621	168300000	6.31685621

Model Simulasi Sistem pengembangan Rute A

Resource

Name	Units	Scheduled Time (DAY)	Number Times Used	Avg Time Per Usage (HR)	Avg Time Travel To Use (HR)	Avg Time Travel To Park (HR)	% Blocked In Travel	% Utilization
Truck.1	1	31	4	4.01	1.57	3.3	0	3.000941
Truck.2	1	31	4	3.54	1.57	3.17	0	2.747581
Truck.3	1	31	4	3.95	1.86	3.21	0	3.124462
Truck.4	1	31	4	3.76	1.43	2.64	0	2.794086
Truck.5	1	31	3	4.51	0.98	3.21	0	2.214247
Truck.6	1	31	4	3.78	1.32	3.01	0	2.746237
Truck.7	1	31	4	3.94	1.77	2.66	0	3.069086
Truck.8	1	31	3	4.01	1.05	3.27	0	2.038038
Truck.9	1	31	4	3.76	1.59	2.94	0	2.877151
Truck.10	1	31	5	3.21	1.86	3.1	0	3.406048
Truck.11	1	31	5	3.87	1.65	3.32	0	3.710349
Truck.12	1	31	4	3.69	1.53	3.18	0	2.80457
Truck.13	1	31	5	3.4	1.9	2.74	0	3.564247
Truck.14	1	31	4	3.92	1.55	3.28	0	2.943414
Truck.15	1	31	4	3.89	1.43	2.88	0	2.860753
Truck.16	1	31	5	3.4	1.79	2.91	0	3.488844
Truck.17	1	31	5	3.46	1.76	3.09	0	3.508065
Truck.18	1	31	4	3.7	1.64	3.27	0	2.869758
Truck.19	1	31	3	4.13	0.92	2.69	0	2.035753
Truck.20	1	31	3	4.58	0.94	3.07	0	2.225672
Truck.21	1	31	5	3.73	1.67	2.59	0	3.623387
Truck.22	1	31	3	3.96	1.13	3.17	0	2.054167
Truck.23	1	31	3	4.11	1.11	3.02	0	2.106183
Truck.24	1	31	3	4.66	1.07	2.87	0	2.313441
Truck.25	1	31	4	3.84	1.63	3.12	0	2.94086
Truck.26	1	31	3	4.36	0.9	3.05	0	2.117608
Truck.27	1	31	3	4.52	1.02	3.22	0	2.233468
Truck.28	1	31	4	3.98	1.57	3.02	0	2.986022
Truck.29	1	31	3	4.23	1.07	3.57	0	2.13629
Truck.30	1	31	5	3.72	1.87	2.77	0	3.758065
Truck.31	1	31	3	4.38	1.01	3.34	0	2.172581
Truck.32	1	31	3	4.1	1.12	3.35	0	2.105511
Truck.33	1	31	4	3.75	1.66	3.48	0	2.911962
Truck.34	1	31	5	3.71	1.93	3.4	0	3.788978
Truck.35	1	31	4	3.76	1.34	2.82	0	2.740457
Truck.36	1	31	3	4.12	0.87	3.22	0	2.012903
Truck.37	1	31	4	4.11	1.63	3.04	0	3.084812

Name	Units	Scheduled Time (DAY)	Number Times Used	Avg Time Per Usage (HR)	Avg Time Travel To Use (HR)	Avg Time Travel To Park (HR)	% Blocked In Travel	% Utilization
Truck.38	1	31	4	3.72	1.46	3.65	0	2.787769
Truck.39	1	31	5	3.46	2.18	3	0	3.788844
Truck.40	1	31	5	3.82	1.96	2.8	0	3.880242
Truck.41	1	31	4	3.73	1.38	3.58	0	2.74664
Truck.42	1	31	5	3.65	1.89	2.98	0	3.724597
Truck.43	1	31	4	3.97	1.49	3.4	0	2.939113
Truck.44	1	31	4	3.83	1.46	3.52	0	2.84207
Truck.45	1	31	5	3.4	1.75	3.3	0	3.463306
Truck.46	1	31	4	3.98	1.57	3.09	0	2.982527
Truck.47	1	31	3	3.99	1.05	3.15	0	2.034677
Truck.48	1	31	4	4.02	1.66	3.09	0	3.049597
Truck.49	1	31	5	3.83	1.89	3.43	0	3.845565
Truck.50	1	31	5	3.92	1.76	3.08	0	3.813844
Truck.51	1	31	4	3.99	1.41	2.59	0	2.904032
Truck.52	1	31	4	3.76	1.55	2.68	0	2.854704
Truck.53	1	31	4	3.95	1.53	3.34	0	2.94879
Truck.54	1	31	3	4.03	1.03	3.15	0	2.043145
Truck.55	1	31	4	3.8	1.58	3.43	0	2.896102
Truck.56	1	31	3	4.13	0.88	2.72	0	2.018817
Truck.57	1	31	4	4.12	1.57	3.18	0	3.060349
Truck.58	1	31	3	4.53	0.99	3.08	0	2.226882
Truck.59	1	31	3	4.24	0.88	3.21	0	2.064785
Truck.60	1	31	5	3.36	1.81	3.21	0	3.476613
Truck.61	1	31	4	4.16	1.41	3.44	0	2.997581
Truck.62	1	31	4	3.61	1.7	2.85	0	2.854301
Truck.63	1	31	4	3.9	1.41	2.75	0	2.854435
Truck.64	1	31	5	3.64	1.84	3.05	0	3.680914
Truck.65	1	31	3	4.04	0.94	3.2	0	2.004032
Truck.66	1	31	3	4.86	0.98	2.88	0	2.354435
Truck.67	1	31	3	4.34	0.89	2.93	0	2.108602
Truck.68	1	31	4	3.62	1.37	2.77	0	2.683065
Truck.69	1	31	4	3.62	1.59	2.85	0	2.800672
Truck.70	1	31	3	4.6	1.03	2.79	0	2.268817
Truck.71	1	31	5	3.88	1.73	3.17	0	3.773253
Truck.72	1	31	3	4.17	1.08	3.33	0	2.119086
Truck.73	1	31	4	3.63	1.45	3.5	0	2.730511
Truck.74	1	31	3	4.07	1.16	3.46	0	2.106048
Truck.75	1	31	4	4.04	1.58	3.23	0	3.022849
Truck.76	1	31	3	4	1.2	3.06	0	2.094892
Truck.77	1	31	3	4.34	1.05	3.63	0	2.172984

Name	Units	Scheduled Time (DAY)	Number Times Used	Avg Time Per Usage (HR)	Avg Time Travel To Use (HR)	Avg Time Travel To Park (HR)	% Blocked In Travel	% Utilization
Truck.78	1	31	5	3.61	1.67	3.04	0	3.55121
Truck.79	1	31	3	3.96	1.15	2.64	0	2.062366
Truck.80	1	31	3	4.08	1.19	3.1	0	2.125672
Truck.81	1	31	3	4.53	1.22	2.76	0	2.31922
Truck.82	1	31	4	3.66	1.77	3.03	0	2.921371
Truck.83	1	31	4	3.87	1.66	3.34	0	2.976344
Truck.84	1	31	3	4.23	0.95	2.81	0	2.086425
Truck.85	1	31	4	3.81	1.34	2.59	0	2.767876
Truck.86	1	31	3	4.46	0.95	3.36	0	2.182661
Truck.87	1	31	4	3.53	1.61	3.3	0	2.765054
Truck.88	1	31	3	4.8	0.89	3.28	0	2.295968
Truck.89	1	31	3	4.31	0.88	3.41	0	2.092608
Truck.90	1	31	5	3.89	1.86	3.01	0	3.865591
Truck.91	1	31	4	3.76	1.63	3.54	0	2.893817
Truck.92	1	31	4	4.1	1.65	2.88	0	3.09207
Truck.93	1	31	3	4.67	0.99	3.49	0	2.28078
Truck.94	1	31	4	3.81	1.61	3.35	0	2.915591
Truck.95	1	31	3	4.1	1.22	3.19	0	2.147715
Truck.96	1	31	5	3.36	1.76	2.71	0	3.441801
Truck.97	1	31	3	4.3	0.99	3.06	0	2.133199
Truck.98	1	31	4	3.44	1.59	2.98	0	2.704167
Truck.99	1	31	5	3.65	1.9	2.87	0	3.734677
Truck.100	1	31	3	4.18	1.18	3.08	0	2.160215
Truck	100	3100	384	3.9	1.48	3.1	0	2.776519
Forklift	1	31	22272	0.01	0	0	0	29.93495
Truck2.1	1	31	384	0.05	0	0.04	0	2.595699
Truck2.2	1	31	0	0	0	0	0	0
Truck2.3	1	31	0	0	0	0	0	0
Truck2.4	1	31	0	0	0	0	0	0
Truck2.5	1	31	0	0	0	0	0	0
Truck2.6	1	31	0	0	0	0	0	0
Truck2.7	1	31	0	0	0	0	0	0
Truck2.8	1	31	0	0	0	0	0	0
Truck2.9	1	31	0	0	0	0	0	0
Truck2.10	1	31	0	0	0	0	0	0
Truck2.11	1	31	0	0	0	0	0	0
Truck2.12	1	31	0	0	0	0	0	0
Truck2.13	1	31	0	0	0	0	0	0
Truck2.14	1	31	0	0	0	0	0	0
Truck2.15	1	31	0	0	0	0	0	0

Name	Units	Scheduled Time (DAY)	Number Times Used	Avg Time Per Usage (HR)	Avg Time Travel To Use (HR)	Avg Time Travel To Park (HR)	% Blocked In Travel	% Utilization
Truck2.16	1	31	0	0	0	0	0	0
Truck2.17	1	31	0	0	0	0	0	0
Truck2.18	1	31	0	0	0	0	0	0
Truck2.19	1	31	0	0	0	0	0	0
Truck2.20	1	31	0	0	0	0	0	0
Truck2	20	620	384	0.05	0	0.04	0	0.129785
Rail.1	1	31	5	18.67	0.1	18.77	0	12.61156
Rail.2	1	31	3	18.67	0.1	18.77	0	7.566935
Rail.3	1	31	3	18.67	0.1	18.77	0	7.566935
Rail.4	1	31	2	18.67	0.1	18.77	0	5.044624
Rail.5	1	31	1	18.67	0.1	18.77	0	2.522312
Rail.6	1	31	0	0	0	0	0	0
Rail.7	1	31	0	0	0	0	0	0
Rail.8	1	31	0	0	0	0	0	0
Rail.9	1	31	0	0	0	0	0	0
Rail.10	1	31	0	0	0	0	0	0
Rail	10	310	14	18.67	0.1	18.77	0	3.531237
Truck3.1	1	31	28	1.67	1.67	0	0	12.53978
Truck3.2	1	31	28	1.67	1.67	0	0	12.53978
Truck3.3	1	31	28	1.67	1.67	0	0	12.53978
Truck3.4	1	31	28	1.67	1.67	0	0	12.53978
Truck3.5	1	31	28	1.67	1.67	0	0	12.53978
Truck3	5	155	140	1.67	1.67	0	0	12.53978
Truck4.1	1	31	6	1.67	1.67	0	0	2.687097
Truck4.2	1	31	6	1.67	1.67	0	0	2.687097
Truck4.3	1	31	6	1.67	1.67	0	0	2.687097
Truck4.4	1	31	6	1.67	1.67	0	0	2.687097
Truck4.5	1	31	6	1.67	1.67	0	0	2.687097
Truck4	5	155	30	1.67	1.67	0	0	2.687097
Rail2	1	31	3	9.33	3.18	9.43	0	5.044624

Resource Cost

Name	Units	NonUse Cost Dollars	% NonUse Cost	Usage Cost Dollars	% Usage Cost	Total Cost Dollars	% Total Cost
Truck.1	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.2	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.3	1	0	0	13800000	0.631636763	13800000	0.631636763

Name	Units	NonUse Cost Dollars	% NonUse Cost	Usage Cost Dollars	% Usage Cost	Total Cost Dollars	% Total Cost
Truck.4	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.5	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.6	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.7	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.8	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.9	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.10	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.11	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.12	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.13	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.14	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.15	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.16	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.17	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.18	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.19	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.20	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.21	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.22	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.23	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.24	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.25	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.26	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.27	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.28	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.29	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.30	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.31	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.32	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.33	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.34	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.35	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.36	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.37	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.38	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.39	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.40	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.41	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.42	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.43	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.44	1	0	0	13800000	0.631636763	13800000	0.631636763

Name	Units	NonUse Cost Dollars	% NonUse Cost	Usage Cost Dollars	% Usage Cost	Total Cost Dollars	% Total Cost
Truck.45	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.46	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.47	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.48	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.49	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.50	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.51	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.52	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.53	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.54	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.55	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.56	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.57	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.58	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.59	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.60	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.61	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.62	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.63	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.64	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.65	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.66	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.67	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.68	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.69	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.70	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.71	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.72	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.73	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.74	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.75	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.76	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.77	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.78	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.79	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.80	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.81	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.82	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.83	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.84	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.85	1	0	0	13800000	0.631636763	13800000	0.631636763

Name	Units	NonUse Cost Dollars	% NonUse Cost	Usage Cost Dollars	% Usage Cost	Total Cost Dollars	% Total Cost
Truck.86	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.87	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.88	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.89	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.90	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.91	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.92	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.93	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.94	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.95	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.96	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.97	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.98	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.99	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.100	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck	100	0	0	1324800000	60.63712926	1324800000	60.63712926
Forklift	1	0	0	0	0	0	0
Truck2.1	1	0	0	0	0	0	0
Truck2.2	1	0	0	0	0	0	0
Truck2.3	1	0	0	0	0	0	0
Truck2.4	1	0	0	0	0	0	0
Truck2.5	1	0	0	0	0	0	0
Truck2.6	1	0	0	0	0	0	0
Truck2.7	1	0	0	0	0	0	0
Truck2.8	1	0	0	0	0	0	0
Truck2.9	1	0	0	0	0	0	0
Truck2.10	1	0	0	0	0	0	0
Truck2.11	1	0	0	0	0	0	0
Truck2.12	1	0	0	0	0	0	0
Truck2.13	1	0	0	0	0	0	0
Truck2.14	1	0	0	0	0	0	0
Truck2.15	1	0	0	0	0	0	0
Truck2.16	1	0	0	0	0	0	0
Truck2.17	1	0	0	0	0	0	0
Truck2.18	1	0	0	0	0	0	0
Truck2.19	1	0	0	0	0	0	0
Truck2.20	1	0	0	0	0	0	0
Truck2	20	0	0	0	0	0	0
Rail.1	1	0	0	275000000	12.58696448	275000000	12.58696448
Rail.2	1	0	0	165000000	7.552178689	165000000	7.552178689
Rail.3	1	0	0	165000000	7.552178689	165000000	7.552178689

Name	Units	NonUse Cost Dollars	% NonUse Cost	Usage Cost Dollars	% Usage Cost	Total Cost Dollars	% Total Cost
Rail.4	1	0	0	110000000	5.034785793	110000000	5.034785793
Rail.5	1	0	0	55000000	2.517392896	55000000	2.517392896
Rail.6	1	0	0	0	0	0	0
Rail.7	1	0	0	0	0	0	0
Rail.8	1	0	0	0	0	0	0
Rail.9	1	0	0	0	0	0	0
Rail.10	1	0	0	0	0	0	0
Rail	10	0	0	770000000	35.24350055	770000000	35.24350055
Truck3.1	1	0	0	0	0	0	0
Truck3.2	1	0	0	0	0	0	0
Truck3.3	1	0	0	0	0	0	0
Truck3.4	1	0	0	0	0	0	0
Truck3.5	1	0	0	0	0	0	0
Truck3	5	0	0	0	0	0	0
Truck4.1	1	0	0	0	0	0	0
Truck4.2	1	0	0	0	0	0	0
Truck4.3	1	0	0	0	0	0	0
Truck4.4	1	0	0	0	0	0	0
Truck4.5	1	0	0	0	0	0	0
Truck4	5	0	0	0	0	0	0
Rail2	1	0	0	90000000	4.119370194	90000000	4.119370194

Model Simulasi Sistem pengembangan Rute B

Resource

Name	Units	Scheduled Time (DAY)	Number Times Used	Avg Time Per Usage (HR)	Avg Time Travel To Use (HR)	Avg Time Travel To Park (HR)	% Blocked In Travel	% Utilization
Truck.1	1	31	4	4.01	1.57	3.3	0	3.000941
Truck.2	1	31	4	3.54	1.57	3.17	0	2.747581
Truck.3	1	31	4	3.95	1.86	3.21	0	3.124462
Truck.4	1	31	4	3.76	1.43	2.64	0	2.794086
Truck.5	1	31	3	4.51	0.98	3.21	0	2.214247
Truck.6	1	31	4	3.78	1.32	3.01	0	2.746237
Truck.7	1	31	4	3.94	1.77	2.66	0	3.069086
Truck.8	1	31	3	4.01	1.05	3.27	0	2.038038
Truck.9	1	31	4	3.76	1.59	2.94	0	2.877151
Truck.10	1	31	5	3.21	1.86	3.1	0	3.406048
Truck.11	1	31	5	3.87	1.65	3.32	0	3.710349
Truck.12	1	31	4	3.69	1.53	3.18	0	2.80457
Truck.13	1	31	5	3.4	1.9	2.74	0	3.564247
Truck.14	1	31	4	3.92	1.55	3.28	0	2.943414
Truck.15	1	31	4	3.89	1.43	2.88	0	2.860753
Truck.16	1	31	5	3.4	1.79	2.91	0	3.488844
Truck.17	1	31	5	3.46	1.76	3.09	0	3.508065
Truck.18	1	31	4	3.7	1.64	3.27	0	2.869758
Truck.19	1	31	3	4.13	0.92	2.69	0	2.035753
Truck.20	1	31	3	4.58	0.94	3.07	0	2.225672
Truck.21	1	31	5	3.73	1.67	2.59	0	3.623387
Truck.22	1	31	3	3.96	1.13	3.17	0	2.054167
Truck.23	1	31	3	4.11	1.11	3.02	0	2.106183
Truck.24	1	31	3	4.66	1.07	2.87	0	2.313441
Truck.25	1	31	4	3.84	1.63	3.12	0	2.94086
Truck.26	1	31	3	4.36	0.9	3.05	0	2.117608
Truck.27	1	31	3	4.52	1.02	3.22	0	2.233468
Truck.28	1	31	4	3.98	1.57	3.02	0	2.986022
Truck.29	1	31	3	4.23	1.07	3.57	0	2.13629
Truck.30	1	31	5	3.72	1.87	2.77	0	3.758065
Truck.31	1	31	3	4.38	1.01	3.34	0	2.172581
Truck.32	1	31	3	4.1	1.12	3.35	0	2.105511
Truck.33	1	31	4	3.75	1.66	3.48	0	2.911962
Truck.34	1	31	5	3.71	1.93	3.4	0	3.788978
Truck.35	1	31	4	3.76	1.34	2.82	0	2.740457
Truck.36	1	31	3	4.12	0.87	3.22	0	2.012903
Truck.37	1	31	4	4.11	1.63	3.04	0	3.084812

Name	Units	Scheduled Time (DAY)	Number Times Used	Avg Time Per Usage (HR)	Avg Time Travel To Use (HR)	Avg Time Travel To Park (HR)	% Blocked In Travel	% Utilization
Truck.38	1	31	4	3.72	1.46	3.65	0	2.787769
Truck.39	1	31	5	3.46	2.18	3	0	3.788844
Truck.40	1	31	5	3.82	1.96	2.8	0	3.880242
Truck.41	1	31	4	3.73	1.38	3.58	0	2.74664
Truck.42	1	31	5	3.65	1.89	2.98	0	3.724597
Truck.43	1	31	4	3.97	1.49	3.4	0	2.939113
Truck.44	1	31	4	3.83	1.46	3.52	0	2.84207
Truck.45	1	31	5	3.4	1.75	3.3	0	3.463306
Truck.46	1	31	4	3.98	1.57	3.09	0	2.982527
Truck.47	1	31	3	3.99	1.05	3.15	0	2.034677
Truck.48	1	31	4	4.02	1.66	3.09	0	3.049597
Truck.49	1	31	5	3.83	1.89	3.43	0	3.845565
Truck.50	1	31	5	3.92	1.76	3.08	0	3.813844
Truck.51	1	31	4	3.99	1.41	2.59	0	2.904032
Truck.52	1	31	4	3.76	1.55	2.68	0	2.854704
Truck.53	1	31	4	3.95	1.53	3.34	0	2.94879
Truck.54	1	31	3	4.03	1.03	3.15	0	2.043145
Truck.55	1	31	4	3.8	1.58	3.43	0	2.896102
Truck.56	1	31	3	4.13	0.88	2.72	0	2.018817
Truck.57	1	31	4	4.12	1.57	3.18	0	3.060349
Truck.58	1	31	3	4.53	0.99	3.08	0	2.226882
Truck.59	1	31	3	4.24	0.88	3.21	0	2.064785
Truck.60	1	31	5	3.36	1.81	3.21	0	3.476613
Truck.61	1	31	4	4.16	1.41	3.44	0	2.997581
Truck.62	1	31	4	3.61	1.7	2.85	0	2.854301
Truck.63	1	31	4	3.9	1.41	2.75	0	2.854435
Truck.64	1	31	5	3.64	1.84	3.05	0	3.680914
Truck.65	1	31	3	4.04	0.94	3.2	0	2.004032
Truck.66	1	31	3	4.86	0.98	2.88	0	2.354435
Truck.67	1	31	3	4.34	0.89	2.93	0	2.108602
Truck.68	1	31	4	3.62	1.37	2.77	0	2.683065
Truck.69	1	31	4	3.62	1.59	2.85	0	2.800672
Truck.70	1	31	3	4.6	1.03	2.79	0	2.268817
Truck.71	1	31	5	3.88	1.73	3.17	0	3.773253
Truck.72	1	31	3	4.17	1.08	3.33	0	2.119086
Truck.73	1	31	4	3.63	1.45	3.5	0	2.730511
Truck.74	1	31	3	4.07	1.16	3.46	0	2.106048
Truck.75	1	31	4	4.04	1.58	3.23	0	3.022849
Truck.76	1	31	3	4	1.2	3.06	0	2.094892
Truck.77	1	31	3	4.34	1.05	3.63	0	2.172984

Name	Units	Scheduled Time (DAY)	Number Times Used	Avg Time Per Usage (HR)	Avg Time Travel To Use (HR)	Avg Time Travel To Park (HR)	% Blocked In Travel	% Utilization
Truck.78	1	31	5	3.61	1.67	3.04	0	3.55121
Truck.79	1	31	3	3.96	1.15	2.64	0	2.062366
Truck.80	1	31	3	4.08	1.19	3.1	0	2.125672
Truck.81	1	31	3	4.53	1.22	2.76	0	2.31922
Truck.82	1	31	4	3.66	1.77	3.03	0	2.921371
Truck.83	1	31	4	3.87	1.66	3.34	0	2.976344
Truck.84	1	31	3	4.23	0.95	2.81	0	2.086425
Truck.85	1	31	4	3.81	1.34	2.59	0	2.767876
Truck.86	1	31	3	4.46	0.95	3.36	0	2.182661
Truck.87	1	31	4	3.53	1.61	3.3	0	2.765054
Truck.88	1	31	3	4.8	0.89	3.28	0	2.295968
Truck.89	1	31	3	4.31	0.88	3.41	0	2.092608
Truck.90	1	31	5	3.89	1.86	3.01	0	3.865591
Truck.91	1	31	4	3.76	1.63	3.54	0	2.893817
Truck.92	1	31	4	4.1	1.65	2.88	0	3.09207
Truck.93	1	31	3	4.67	0.99	3.49	0	2.28078
Truck.94	1	31	4	3.81	1.61	3.35	0	2.915591
Truck.95	1	31	3	4.1	1.22	3.19	0	2.147715
Truck.96	1	31	5	3.36	1.76	2.71	0	3.441801
Truck.97	1	31	3	4.3	0.99	3.06	0	2.133199
Truck.98	1	31	4	3.44	1.59	2.98	0	2.704167
Truck.99	1	31	5	3.65	1.9	2.87	0	3.734677
Truck.100	1	31	3	4.18	1.18	3.08	0	2.160215
Truck	100	3100	384	3.9	1.48	3.1	0	2.776519
Forklift	1	31	22272	0.01	0	0	0	29.93495
Truck2.1	1	31	384	0.05	0	0.04	0	2.595699
Truck2.2	1	31	0	0	0	0	0	0
Truck2.3	1	31	0	0	0	0	0	0
Truck2.4	1	31	0	0	0	0	0	0
Truck2.5	1	31	0	0	0	0	0	0
Truck2.6	1	31	0	0	0	0	0	0
Truck2.7	1	31	0	0	0	0	0	0
Truck2.8	1	31	0	0	0	0	0	0
Truck2.9	1	31	0	0	0	0	0	0
Truck2.10	1	31	0	0	0	0	0	0
Truck2.11	1	31	0	0	0	0	0	0
Truck2.12	1	31	0	0	0	0	0	0
Truck2.13	1	31	0	0	0	0	0	0
Truck2.14	1	31	0	0	0	0	0	0
Truck2.15	1	31	0	0	0	0	0	0

Name	Units	Scheduled Time (DAY)	Number Times Used	Avg Time Per Usage (HR)	Avg Time Travel To Use (HR)	Avg Time Travel To Park (HR)	% Blocked In Travel	% Utilization
Truck2.16	1	31	0	0	0	0	0	0
Truck2.17	1	31	0	0	0	0	0	0
Truck2.18	1	31	0	0	0	0	0	0
Truck2.19	1	31	0	0	0	0	0	0
Truck2.20	1	31	0	0	0	0	0	0
Truck2	20	620	384	0.05	0	0.04	0	0.129785
Rail.1	1	31	5	18.67	0.1	18.77	0	12.61156
Rail.2	1	31	3	18.67	0.1	18.77	0	7.566935
Rail.3	1	31	3	18.67	0.1	18.77	0	7.566935
Rail.4	1	31	2	18.67	0.1	18.77	0	5.044624
Rail.5	1	31	1	18.67	0.1	18.77	0	2.522312
Rail.6	1	31	0	0	0	0	0	0
Rail.7	1	31	0	0	0	0	0	0
Rail.8	1	31	0	0	0	0	0	0
Rail.9	1	31	0	0	0	0	0	0
Rail.10	1	31	0	0	0	0	0	0
Rail	10	310	14	18.67	0.1	18.77	0	3.531237
Truck3.1	1	31	28	1.67	1.67	0	0	12.53978
Truck3.2	1	31	28	1.67	1.67	0	0	12.53978
Truck3.3	1	31	28	1.67	1.67	0	0	12.53978
Truck3.4	1	31	28	1.67	1.67	0	0	12.53978
Truck3.5	1	31	28	1.67	1.67	0	0	12.53978
Truck3	5	155	140	1.67	1.67	0	0	12.53978
Truck4.1	1	31	6	1.67	1.67	0	0	2.687097
Truck4.2	1	31	6	1.67	1.67	0	0	2.687097
Truck4.3	1	31	6	1.67	1.67	0	0	2.687097
Truck4.4	1	31	6	1.67	1.67	0	0	2.687097
Truck4.5	1	31	6	1.67	1.67	0	0	2.687097
Truck4	5	155	30	1.67	1.67	0	0	2.687097
Rail2	1	31	3	9.33	3.18	9.43	0	5.044624

Resource Cost

Name	Units	NonUse Cost Dollars	% NonUse Cost	Usage Cost Dollars	% Usage Cost	Total Cost Dollars	% Total Cost
Truck.1	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.2	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.3	1	0	0	13800000	0.631636763	13800000	0.631636763

Name	Units	NonUse Cost Dollars	% NonUse Cost	Usage Cost Dollars	% Usage Cost	Total Cost Dollars	% Total Cost
Truck.4	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.5	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.6	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.7	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.8	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.9	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.10	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.11	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.12	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.13	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.14	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.15	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.16	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.17	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.18	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.19	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.20	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.21	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.22	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.23	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.24	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.25	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.26	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.27	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.28	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.29	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.30	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.31	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.32	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.33	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.34	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.35	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.36	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.37	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.38	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.39	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.40	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.41	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.42	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.43	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.44	1	0	0	13800000	0.631636763	13800000	0.631636763

Name	Units	NonUse Cost Dollars	% NonUse Cost	Usage Cost Dollars	% Usage Cost	Total Cost Dollars	% Total Cost
Truck.45	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.46	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.47	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.48	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.49	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.50	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.51	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.52	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.53	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.54	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.55	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.56	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.57	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.58	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.59	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.60	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.61	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.62	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.63	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.64	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.65	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.66	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.67	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.68	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.69	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.70	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.71	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.72	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.73	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.74	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.75	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.76	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.77	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.78	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.79	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.80	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.81	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.82	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.83	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.84	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.85	1	0	0	13800000	0.631636763	13800000	0.631636763

Name	Units	NonUse Cost Dollars	% NonUse Cost	Usage Cost Dollars	% Usage Cost	Total Cost Dollars	% Total Cost
Truck.86	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.87	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.88	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.89	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.90	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.91	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.92	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.93	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.94	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.95	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.96	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.97	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck.98	1	0	0	13800000	0.631636763	13800000	0.631636763
Truck.99	1	0	0	17250000	0.789545954	17250000	0.789545954
Truck.100	1	0	0	10350000	0.473727572	10350000	0.473727572
Truck	100	0	0	1324800000	60.63712926	1324800000	60.63712926
Forklift	1	0	0	0	0	0	0
Truck2.1	1	0	0	0	0	0	0
Truck2.2	1	0	0	0	0	0	0
Truck2.3	1	0	0	0	0	0	0
Truck2.4	1	0	0	0	0	0	0
Truck2.5	1	0	0	0	0	0	0
Truck2.6	1	0	0	0	0	0	0
Truck2.7	1	0	0	0	0	0	0
Truck2.8	1	0	0	0	0	0	0
Truck2.9	1	0	0	0	0	0	0
Truck2.10	1	0	0	0	0	0	0
Truck2.11	1	0	0	0	0	0	0
Truck2.12	1	0	0	0	0	0	0
Truck2.13	1	0	0	0	0	0	0
Truck2.14	1	0	0	0	0	0	0
Truck2.15	1	0	0	0	0	0	0
Truck2.16	1	0	0	0	0	0	0
Truck2.17	1	0	0	0	0	0	0
Truck2.18	1	0	0	0	0	0	0
Truck2.19	1	0	0	0	0	0	0
Truck2.20	1	0	0	0	0	0	0
Truck2	20	0	0	0	0	0	0
Rail.1	1	0	0	275000000	12.58696448	275000000	12.58696448
Rail.2	1	0	0	165000000	7.552178689	165000000	7.552178689
Rail.3	1	0	0	165000000	7.552178689	165000000	7.552178689

Name	Units	NonUse Cost Dollars	% NonUse Cost	Usage Cost Dollars	% Usage Cost	Total Cost Dollars	% Total Cost
Rail.4	1	0	0	110000000	5.034785793	110000000	5.034785793
Rail.5	1	0	0	55000000	2.517392896	55000000	2.517392896
Rail.6	1	0	0	0	0	0	0
Rail.7	1	0	0	0	0	0	0
Rail.8	1	0	0	0	0	0	0
Rail.9	1	0	0	0	0	0	0
Rail.10	1	0	0	0	0	0	0
Rail	10	0	0	770000000	35.24350055	770000000	35.24350055
Truck3.1	1	0	0	0	0	0	0
Truck3.2	1	0	0	0	0	0	0
Truck3.3	1	0	0	0	0	0	0
Truck3.4	1	0	0	0	0	0	0
Truck3.5	1	0	0	0	0	0	0
Truck3	5	0	0	0	0	0	0
Truck4.1	1	0	0	0	0	0	0
Truck4.2	1	0	0	0	0	0	0
Truck4.3	1	0	0	0	0	0	0
Truck4.4	1	0	0	0	0	0	0
Truck4.5	1	0	0	0	0	0	0
Truck4	5	0	0	0	0	0	0
Rail2	1	0	0	90000000	4.119370194	90000000	4.119370194

LAMPIRAN D
OUTPUT SIMULASI PROMODEL
KEDATANGAN MATERIAL DALAM
12 REPLIKASI

Model Simulasi Sistem saat ini (Moda Truk)

ARRIVAL

Name	Replication	Scheduled Time (DAY)	Capacity	Total Entries	Avg Time Per Entry (HR)	Avg Contents	Maximum Contents	Current Contents	% Utilization
WH Semarang	1	62	50000	22294	79.59	1192.506	13420	22	2.385012
WH Semarang	2	62	50000	22239	79.39	1186.466	11287	25	2.372932
WH Semarang	3	62	50000	20527	79.97	1103.252	10804	53	2.206504
WH Semarang	4	62	50000	20173	80	1084.598	10769	47	2.169195
WH Semarang	5	62	50000	21911	80.05	1178.702	11504	45	2.357405
WH Semarang	6	62	50000	20448	79.12	1087.322	11567	32	2.174644
WH Semarang	7	62	50000	24480	79.11	1301.494	14156	4	2.602989
WH Semarang	8	62	50000	17405	75.92	888.0785	8879	5	1.776157
WH Semarang	9	62	50000	20892	78.22	1098.193	11623	12	2.196387
WH Semarang	10	62	50000	20225	79.6	1081.918	11169	41	2.163836
WH Semarang	11	62	50000	16974	78.49	895.3013	9475	38	1.790603
WH Semarang	12	62	50000	23915	79.31	1274.667	12421	19	2.549335

Model Simulasi Sistem pengembangan Rute A

ARRIVAL

Name	Replication	Scheduled Time (DAY)	Capacity	Total Entries	Avg Time Per Entry (HR)	Avg Contents	Maximum Contents	Current Contents	% Utilization
WH Semarang	1	31	50000	22294	4.85	145.2139	7620	22	0.290428
WH Semarang	2	31	50000	19468	4.29	112.2978	4165	38	0.224596
WH Semarang	3	31	50000	21875	4.12	121.02	5287	9	0.24204
WH Semarang	4	31	50000	19192	4.42	113.9478	3866	52	0.227896
WH Semarang	5	31	50000	21911	4.38	129.0989	5704	45	0.258198
WH Semarang	6	31	50000	19143	3.61	92.89353	4864	3	0.185787
WH Semarang	7	31	50000	21982	3.75	110.6943	6404	0	0.221389
WH Semarang	8	31	50000	21279	4.94	141.2257	5097	51	0.282451
WH Semarang	9	31	50000	21188	4.05	115.3605	5702	18	0.230721
WH Semarang	10	31	50000	16283	3.91	85.66562	3233	43	0.171331
WH Semarang	11	31	50000	20194	3.79	102.947	5346	10	0.205894
WH Semarang	12	31	50000	22263	4.51	134.9812	6719	49	0.269962

Model Simulasi Sistem pengembangan Rute B

Name	Replication	Scheduled Time (DAY)	Capacity	Total Entries	Avg Time Per Entry (HR)	Avg Contents	Maximum Contents	Current Contents	% Utilization
WH Semarang	1	31	50000	22494	11.77	355.9572	10604	48	0.711914
WH Semarang	2	31	50000	22529	11.14	337.221	9989	25	0.674442
WH Semarang	3	31	50000	22449	10.36	312.5192	8587	3	0.625038
WH Semarang	4	31	50000	21461	10.18	293.5827	8817	1	0.587165
WH Semarang	5	31	50000	24040	11.93	385.5858	9136	28	0.771172
WH Semarang	6	31	50000	21239	10.76	307.2531	10284	11	0.614506
WH Semarang	7	31	50000	20326	10.15	277.4327	7972	26	0.554865
WH Semarang	8	31	50000	24374	12.52	410.0482	10570	14	0.820096
WH Semarang	9	31	50000	21400	10.72	308.2421	8533	56	0.616484
WH Semarang	10	31	50000	23103	11.71	363.7286	10343	19	0.727457
WH Semarang	11	31	50000	20415	10.43	286.2626	7745	57	0.572525
WH Semarang	12	31	50000	23334	11.33	355.1897	9811	18	0.710379