



The Application of Covid-19 Regulations in Businesses

Spring 2021

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IE 4466 SENIOR DESIGN



Project Background

- Impact on Businesses
- Shutdown/Open
- Adapt
- Essential/Nonessential
- Other Situations



Overall Concept

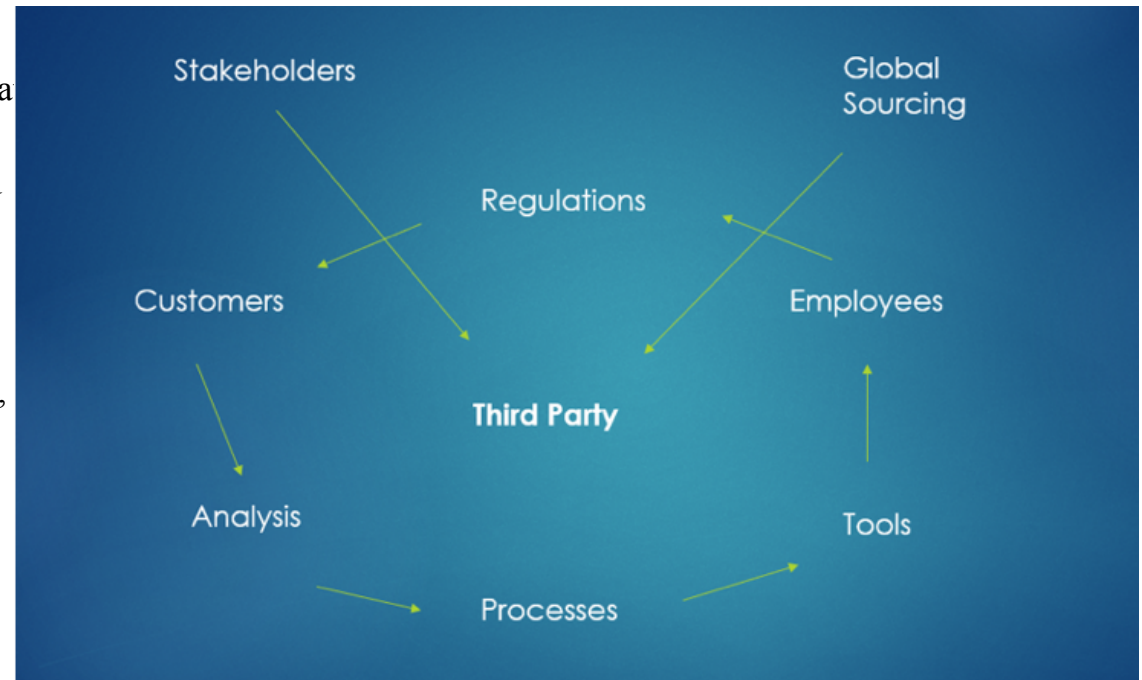


- Customer Requests Services
- Examine Location
- Determine Gap
- Provide Covid-19 Safety Training
- Supply customers with PPE
- Perform Audits

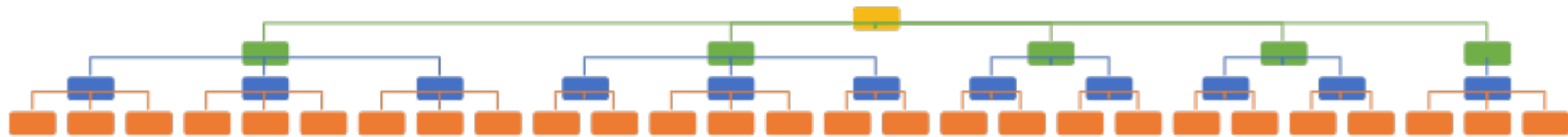
References: graphical process - Bing images

Concept of Operations

- 1.Stakeholders: Internal/External and State and Federal Covid-19 Regulations
- 2.Global Sourcing: Global Sourcing and Purchasing of products
- 3.Customers: Business Owners
- 4.Analysis: Initial Analysis/Audits
- 5.Tools: Thermometers, Hand sanitizers, gloves, masks and App
- 6.Processes: Customer needs and gap
- 7.Employees: Customers Employees
- 8.Regulations: Training/Audits



System Decomposition and Requirements



Requirements Validation and Verification Plan

Subsystem/Part Name	Requirement ID	Reqmt Title	Requirement	Requirement Validation	I	A	T	U	Verification Plan
Determine gap with current Covid-19 Regulations	2.2.1	Current Safety Measures	Customers shall provide us with current safety measures being used against Covid-19.	Third party will request current safety measures being used against Covid-19 from customer.	X				System will be programed to send out a request for current safety measures being used against Covid-19 via email once the first appointment is scheduled. Appointment will be automatically cancelled if information is not sent within one (1) week of appointment.

Subsystem/Part Name	Requirement ID	Reqmt Title	Requirement	Requirement Validation	I	A	T	U	Verification Plan
Determine gap with current Covid-19 Regulations	2.2.3	Recommendations	Third Party shall make recommendations to improve safety measures and compliance with regulations in business operations.	Third party will write missing recommendations on document to be sent via email to trainers.	X				A mechanism will be developed in the system where if there is a missing safety regulation that was not addressed by the reader (blank box), the system will not allow it to be submitted and forwarded to the trainers. (example: Is business following OSHA 00CFR XXXX? Yes or No. If no, explain in the box).

Subsystem/Part Name	Requirement ID	Reqmt Title	Requirement	Requirement Validation	I	A	T	U	Verification Plan
Utilization of Supplies	3.3.2	Training for use of supplies	Employess shall have received basic training for the utilization of supplies prior to use.	Employee must sign up and attend training for proper use of supplies	x				Employee file must have a cerificate showing that he/she underwent the basic training

Subsystem and Part Design

Requirement	Requirement Validation	I	A	T	D	Verification Plan	Verification Data
Third Party shall make recommendations to improve safety measures and compliance with regulations in business operations.	Third party will write missing recommendations on document to be sent via email to trainers.	X				A mechanism will be developed for the system where if there is a missing safety regulation that was not addressed by the reader (blank box), the system will not allow it to be submitted and forwarded to the trainers. (example: Is business following OSHA 00CFR XXXX? Yes or No. If no, explain in the box).	Trainer will receive an email with the completed form of "safety regulations" of the customer's business. Third Party will also receive an email stating confirmation that the form was sent to the Trainer.
Business shall have at least 50 employees to perform Queing Analysis.	The customer will provide roster of current employees (current number of employees employed) via email on a spreadsheet (each row is for a different employee).	x				If the spreadsheet has less than 50 rows (entries), do not approve and communicate with the customer if there are any missing employees, or information.	Spreadsheet will be saved on third party's database. Customer will receive an email confirming that there is no missing data, OR customer will receive an email stating that there is missing information/employees.
Business shall provide employee shift schedules to the third party.	Business will send via e-mail all current employee schedules and past schedules for the last 3 months.	X				The reveiver of the email will manually verify that all current schedules and past schedules for the last 3 months were received.	Schedules will be saved on third party's database. An email will be sent to the business confirming that all current and past schedules for the last 3 months were received and without error, OR an email stating otherwise.



Item Description	Location	Vendor	Unit cost	Pcs per Unit	PastWeek Stock	Current Qty Stock	Units Received	Date Received	Unit Received Cost	Total Inventory Cost
KN95 Facemask		BLScode	\$59.74	60.00	0	0	1		\$59.74	\$59.74

[illegible]

[Name of Third Party] Senior Project CO.

Date: 0/0/2021

Example Business Name

Business Address 1111 Dr.

El Paso, Tx.

RE: NOTICE OF AUDIT

AUDIT TYPE: Success of employee training and compliance with WHO, OSHA, and CDC standards and guidance in regards to COVID-19

LICENSE: WUOLWU

To whom it may concern

The [third party name] will be conducting it's monthly COVID-19 training audit this upcoming 0/0/2021. The purpose of this audit is to observe current business and employee practices that are in or not in compliance with WHO, OSHA, and CDC standards and guidelines listed in the attached form called "COVID-19 audit form" for COVID-19 and other respiratory illness.

The business may have to allow intrusion to certain restricted areas in the facility in order to observe with detail the practices of employees in their usual work environment. This is done to fully provide you with the necessary guidance to becoming compliance with the listed regulations, standards and guidelines in the previously mentioned form.

Additional information can be accessed through the website seniorproject.com

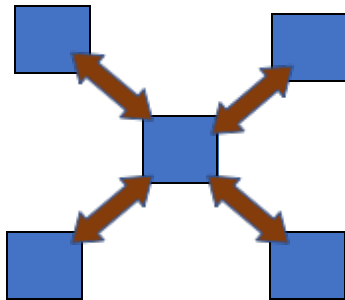
The assigned auditor's contact information is listed below. If you wish to reschedule the audit, you may contact the auditor to agree upon a common date.

Auditor name:

Auditor phone number:

Auditor email:

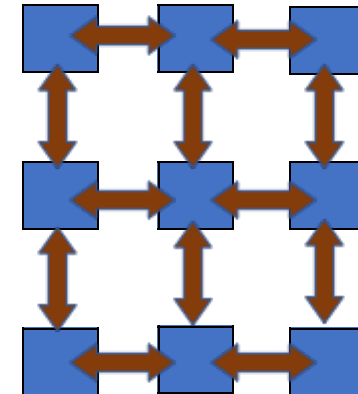
- Area in $\text{ft}^2 = [-6 + 7.5\sqrt{n}]^2$



Total Area for 9 people:
598.867 ft^2




Total Area for 9 people:
92.25 ft^2



Total Area for 9 people:
272.25 ft^2

 6 feet

 1.5 ft per side = 2.25 ft^2

Panel

Enter Number for the corresponding number of Check-in stations of the Business

1 = entry with 1 check-in station
(m/m/1/gd/inf/inf)

2 = entry with 2 or more Check-in stations
(m/m/s/gd/inf/inf)

Panel2

Enter Arrival Rate λ people/hour

Enter Service Rate μ people served/hour

Probability (p)

Avg Entities in whole system (L)

Avg Entities in Queue (Lq)

Avg Time Entity Spends in System (W)

Avg Time an Entity waits in Line (Wq)

Panel3

Enter Service Rate μ

Enter Arrival Rate λ

Enter # of Servers "s"

Probability (p)

Enter Z-Value from Table using Probability (p) from above

Avg Entities in whole system (L)

Avg Entities in Service (Ls)

Avg Entity time in service (Ws)

Avg Entity time in System (W)

Avg Entities in Queue (Lq)

Use this Table to enter Z-Value

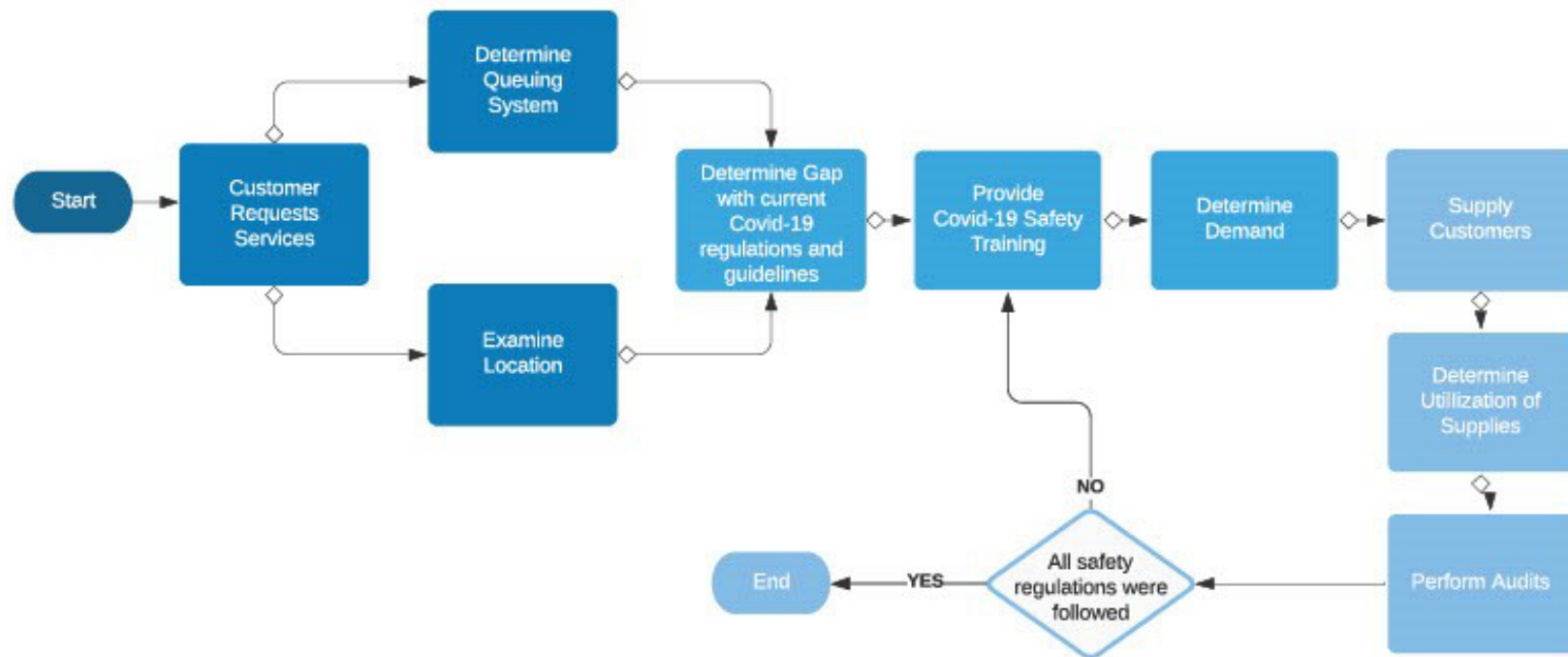
P(j ≥ x) for the M/M/s/∞ Queueing System

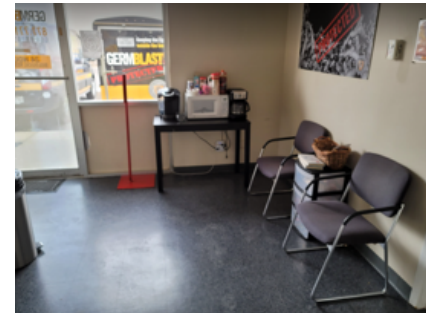
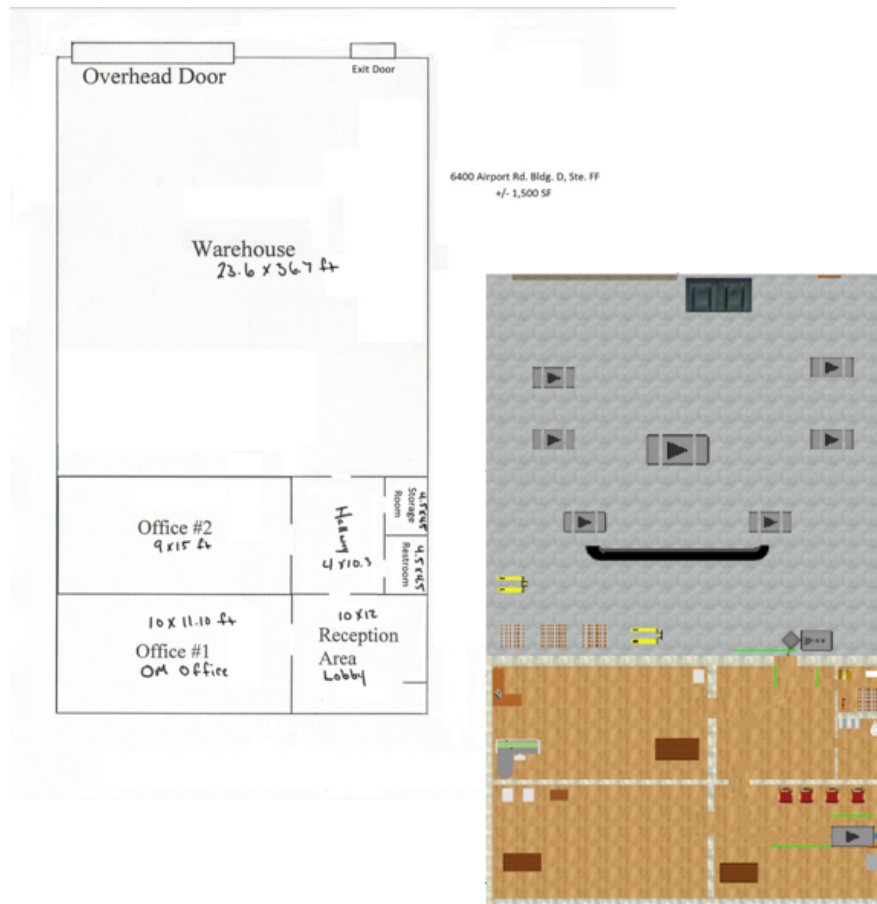
p	x = 2	x = 3	x = 4	x = 5	x = 6	x = 7
.10	.02	.00	.00	.00	.00	.00
.20	.07	.02	.00	.00	.00	.00
.30	.14	.07	.04	.02	.01	.00
.40	.23	.14	.09	.06	.04	.03
.50	.33	.24	.17	.13	.10	.08
.55	.39	.29	.23	.18	.14	.11
.60	.45	.35	.29	.24	.20	.17
.65	.51	.42	.35	.30	.26	.21
.70	.57	.51	.43	.38	.34	.30
.75	.64	.57	.51	.46	.42	.39
.80	.71	.65	.60	.55	.52	.49
.85	.78	.73	.69	.65	.62	.60
.90	.85	.83	.79	.76	.74	.72
.95	.92	.91	.89	.88	.87	.85

(WARNING: If $p > 1$ the queue will "blow-up" more people will be arriving than what your servers can handle)

Source of Table: Page 1088
https://fac.ksu.edu.sa/sites/default/files/books_3337_0.pdf

Recomposing Parts into Final System





Panel3

Enter Service Rate μ

Enter Arrival Rate λ

Enter # of Servers "s" (other than 1)

Enter to Receive Probability (p)

Probability (p)

Enter Z-Value from Table using Probability (p) from above

Submit Z-Value

Avg Entities in whole system (L)

Avg Entity time In System (W)

Avg Entities in Service (Ls)

Avg Entities in Queue (Lq)

Avg Entity time in service (Ws)

Validating Overall System

- Requirement validation
 - Systematic manual analysis of requirement
- Prototyping
 - Using the prototype of the system to check the requirements
- Test case
 - Unit test
 - Usability Test
 - Code inspection
 - Customer acceptance
 - System testing

Questions?