

WAR REFUGEE PROCESSING ISSUES

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PROBLEM STATEMENT

The problem is that the inadequate screening and assessment of war refugees in Ukraine and Russia is causing difficulties in providing proper support and protection, leading to a humanitarian crisis. The ongoing conflicts and wars in the region have resulted in a large influx of refugees seeking safety and shelter. However, the lack of proper screening and assessment processes has resulted in difficulties in identifying those who are most vulnerable and in need of assistance, leading to inadequate support and protection for many refugees. This is a pressing issue as it not only affects the well-being of the refugees but also has wider social and economic implications for the host communities and countries. It is essential to address this problem to ensure that the needs of war refugees are met and to prevent further humanitarian crises in the region.

SCOPE

- Screening Refugee based on categories:
 - Gender
 - Mental Health (Trauma)
 - Physical Health
 - Behavior (suspicious behavior, cooperation, volunteering)
 - Age
- Security System for Refugees
- Healthcare Services
- Transportation

OUT of SCOPE

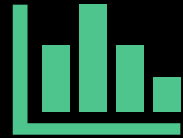
- Laws related to Refugee eligibility
- Opinions of any country or political part
- Resource accrument, cost and budget for medicare, food and security
- Improvement of refugee architecture to contain more refugees

Overview



Quality Methods

COPQ
Process Flow Chart
Tree Diagram
Cause and Effect Chart
Affinity Diagram
Lean, Six Sigma
Gage R&R
FMEA



Detected Problems

Food Rations
Transportation Type
Transportation Capacity
Healthcare Supplies



Solutions

Design of Experiments
Gage R&R
VSM
Capability Analysis

Quality Methods

Cost Of Poor Quality

Prevention costs:

Developing and implementing proper screening and assessment procedures for war refugees to identify those who are most vulnerable and in need of assistance.

Providing adequate training and resources to frontline workers to ensure they can effectively carry out their responsibilities.

Appraisal costs:

Regularly monitoring and evaluating the effectiveness of the screening and assessment procedures to ensure they are meeting the needs of war refugees and host communities.

Conducting thorough background checks and security screenings to identify potential security risks.

Internal failure costs:

Providing emergency assistance and support to refugees who were not properly identified as vulnerable and in need of assistance.

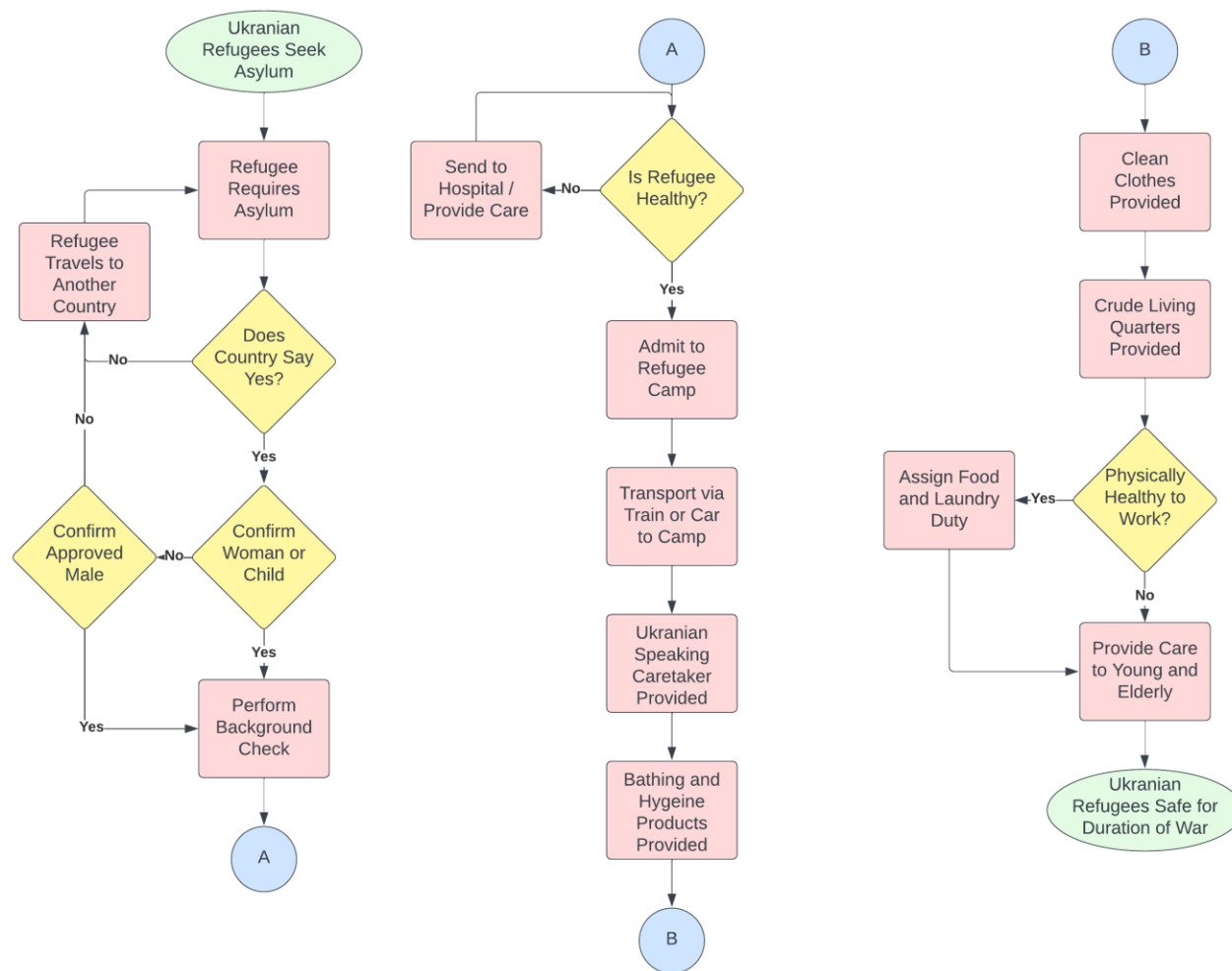
Addressing the needs of refugees who were not adequately screened and assessed, resulting in inadequate support and protection.

External failure costs:

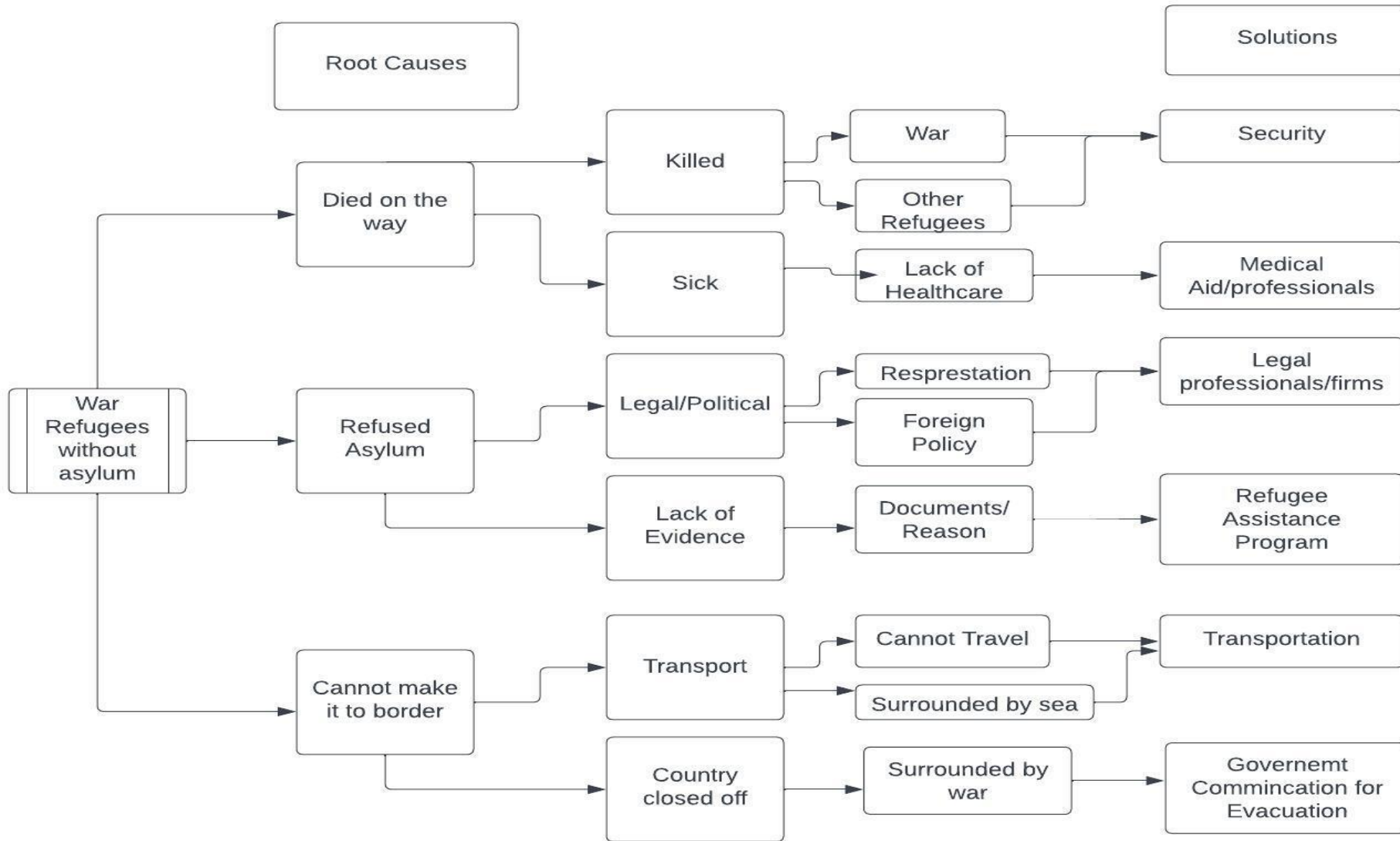
Dealing with the economic and social impact of a humanitarian crisis caused by inadequate screening and assessment of war refugees.

Addressing the potential security risks posed by refugees who were not properly screened and assessed.

Process Flow Chart

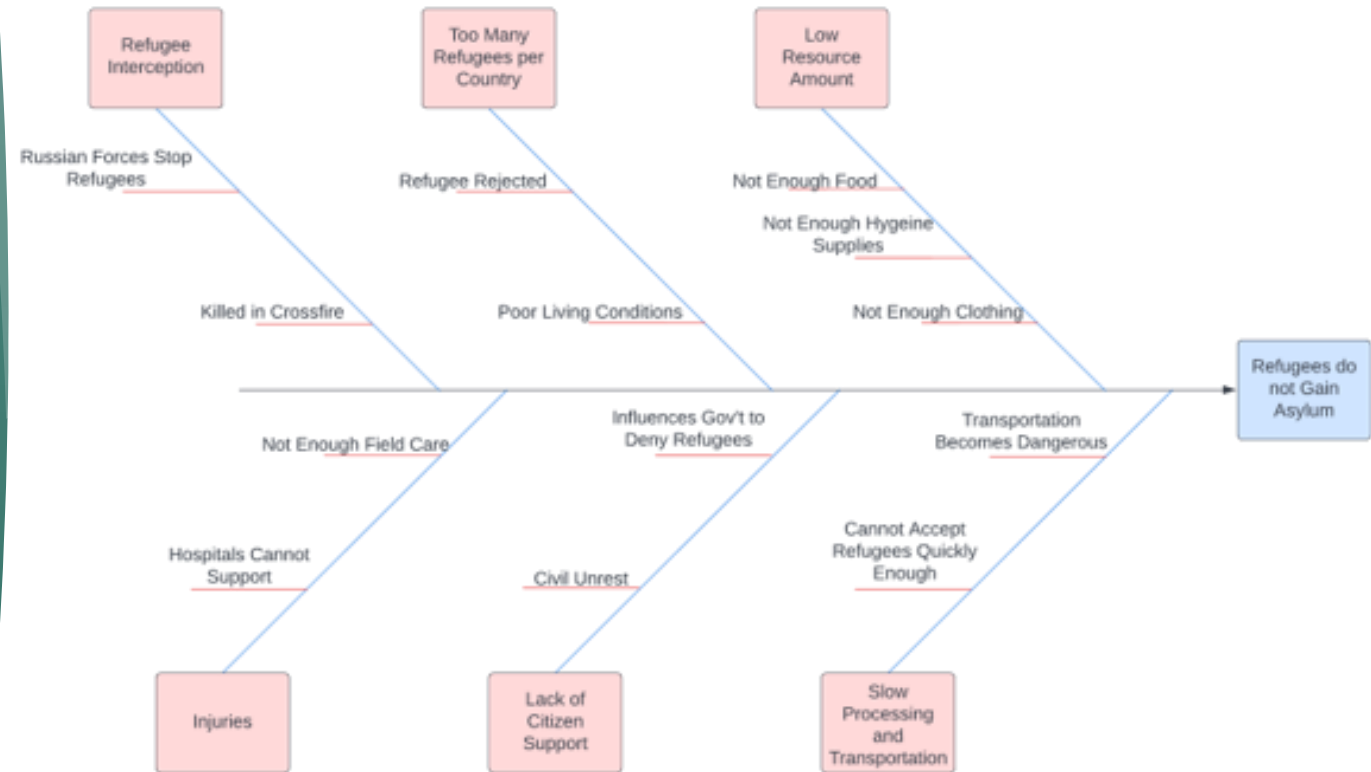


Tree Diagram



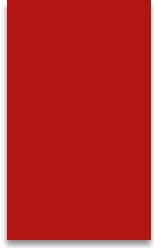
Cause and Effect Chart

- ▶ **Measurement & System Analysis:** This will be used to standardize and calibrate the systems measurement used for experiment and measure purposes
- ▶ **Define the metrics:** Identify the key metrics that will be used to measure the efficiency and effectiveness of the refugee processing system. Examples: Processing time, customer satisfaction.
- ▶ **Collect data:** Gather data on the current refugee processing procedures, including processing times, number of applications, and feedback from refugees.
- ▶ **Establish a baseline:** This will be used to track progress and measure the effectiveness of any changes made to the processing system.
- ▶ **Identify gaps:** To prioritize areas for improvement and guide the selection of improvement initiatives.
- ▶ **Validate the data:** Validate the data to ensure that it is accurate and reliable.
- ▶ **Document the findings:** Document the findings from the data analysis and present them in a clear and concise manner. To inform the next phase, Analyze, where the root causes of the processing issues will be identified and prioritized.



Refugee Interception	Too Many Refugees per Country	Low Resources	Injuries/Medical Delays	Lack of Support	Slow Processing And Transportation
Border patrol stops refugees	Not enough space	Food	Little or no field care	Able Citizens/Locals	Too dangerous to move
Killed in the crossfire	Poor living conditions	Hygienic supplies	Trained Medicare professionals	Government	Too many refugees to be able to accept
Turned away	Rejection of refugees	Clothing	Medical organizers	Local hospitals	Not enough staff to process
In fighting and violence within refugees		Sleeping arrangements	Not enough room for sick and injured in hospitals	Security	Not enough transportation

Affinity Diagram



Lean



Lean can be used to improve the capability of obtaining any resources

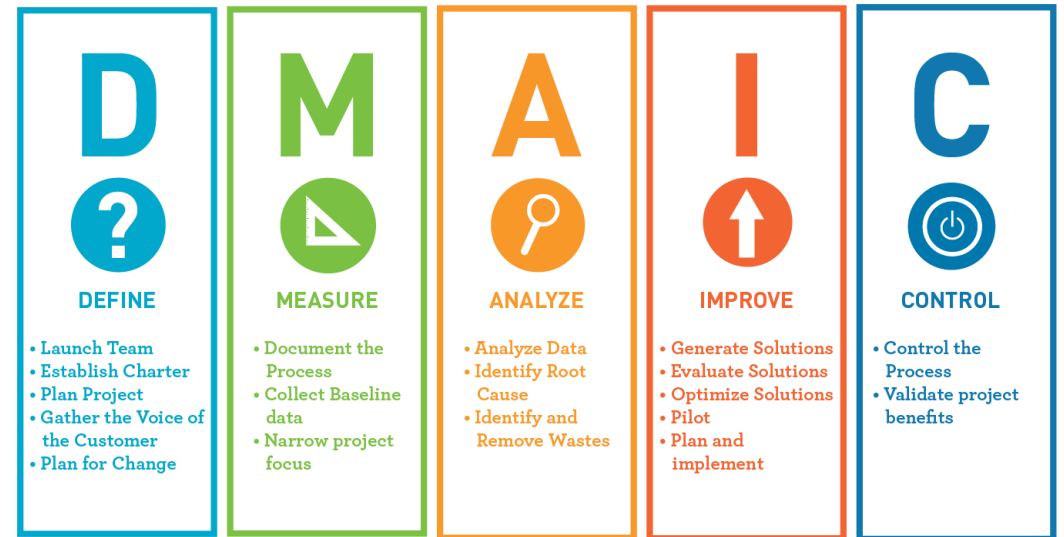


Possible uses include:

- Improving transportation speed
- Improve quality of water filtering
- Increase transportation capacity

Six Sigma

- ▶ Similar to Lean
- ▶ About reducing variation
- ▶ Both use DMAIC, seen to the right, to solve and monitor



Gage R&R

Repeatability:

The variation in one worker doing the same process

Reproducibility:

The variation in multiple workers doing the same process

Stability:

Variation in the measurements due to gage

An acceptable Gage R&R study should yield results showing that the R&R variation is less than 10%

FMEA

- ▶ Reliability Analysis
- ▶ Step by step method for finding failures in design, products, assembly processes or services
- ▶ Helps remove causes of failures
- ▶ Develop systems that can mitigate the effects of failures to prioritize on high risk failures

Problems Detected

What Was Detected?

- ▶ There were issues with the food rations not being the correct size
- ▶ Transportation by train was not a capable process.
- ▶ Transportation Type and Percent Capacity: Have large effects on amount of people processed properly
- ▶ Hygiene Supplies were Inadequate and Falling Behind

Food Ration Problem

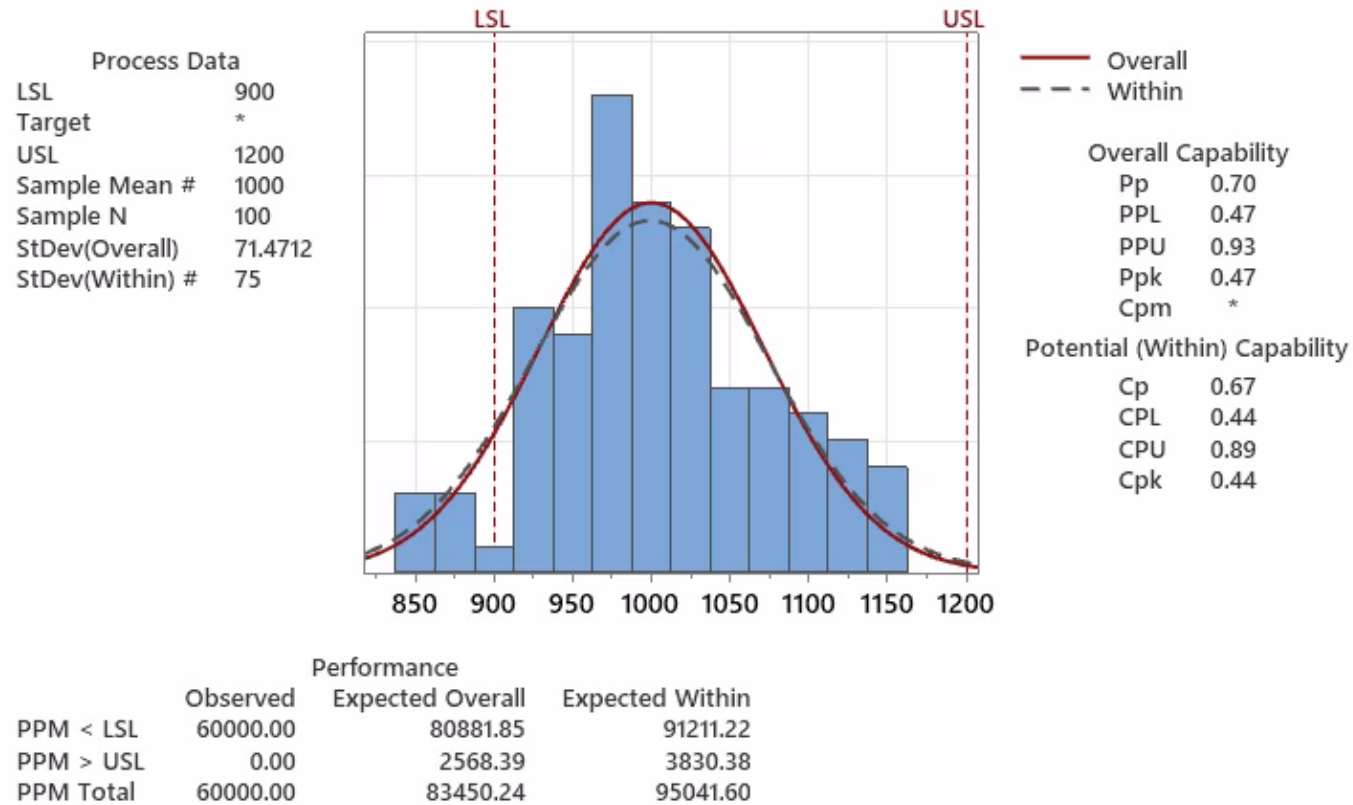
We came across an issue with rationing food to the refugees.

We have several workers in food storage who create the rations using a kilogram scale, so we decide to choose three workers to use one of the scales to perform a Gage R&R study.



Capability Analysis of Train Transportation

Process Capability Report for Before



DOE: Perform Four Runs

Run	Avg.	Var.		A	B	AB
Y1 (Bus, 85%)	4.34	4.92	SumY+	15.90	12.00	11.92
Y2 (Train, 85%)	8.32	3.74	SumY-	8.76	12.66	12.74
Y3 (Bus, 95%)	4.42	0.73	AvgY+	7.95	6.00	5.96
Y4 (Train, 95%)	7.58	7.45	AvgY-	4.38	6.33	6.37
			Effect	3.57	-0.33	-0.41

** Each Run has Four Tests

Transportation Type and Capacity

Coded Coefficients

Term	Effect	Coef	SE Coef	T-Value	P-Value	VIF
Constant		6.163	0.513	12.02	0.000	
Size Type	3.570	1.785	0.513	3.48	0.005	1.00
Amount of Size	-0.330	-0.165	0.513	-0.32	0.753	1.00
Size Type*Amount of Size	-0.415	-0.208	0.513	-0.40	0.693	1.00

Coefficients

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
2.05150	50.78%	38.47%	12.50%

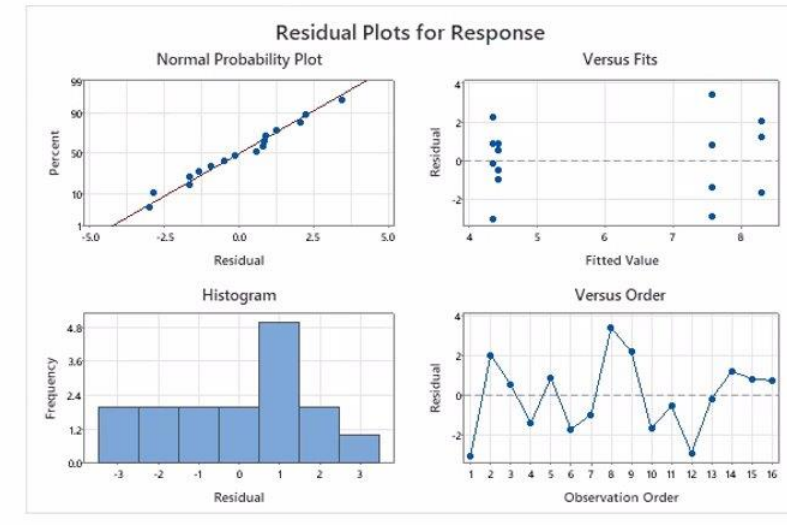
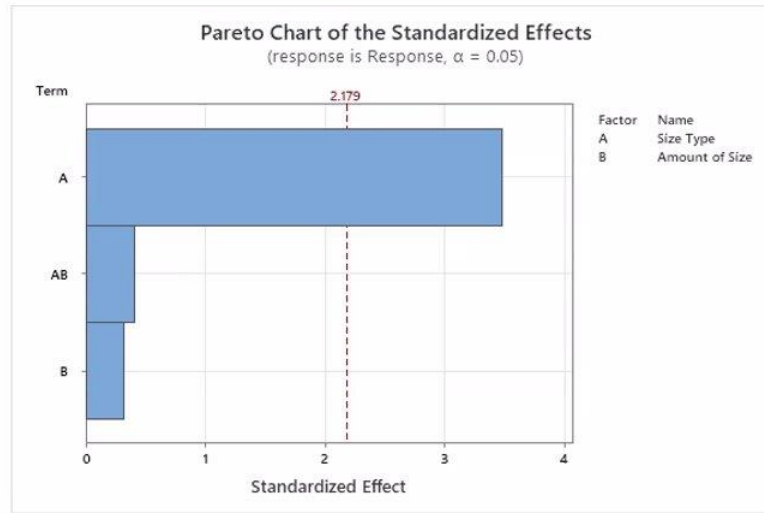
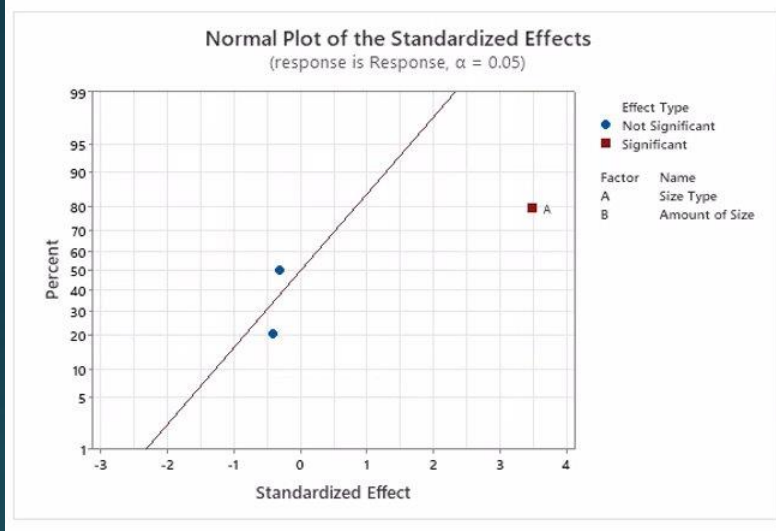
Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Model	3	52.104	17.3680	4.13	0.032
Linear	2	51.415	25.7076	6.11	0.015
Size Type	1	50.980	50.9796	12.11	0.005
Amount of Size	1	0.436	0.4356	0.10	0.753
2-Way Interactions	1	0.689	0.6889	0.16	0.693
Size Type*Amount of Size	1	0.689	0.6889	0.16	0.693
Error	12	50.504	4.2086		
Total	15	102.608			

Regression Equation in Uncoded Units

Response = 6.88 + 2.68 Size Type - 0.110 Amount of Size - 0.138 Size Type*Amount of Size

RESULTS



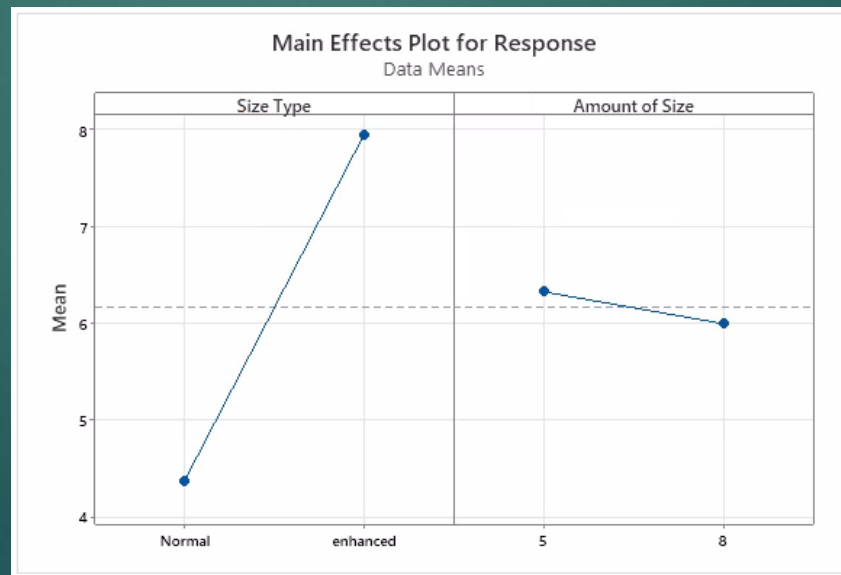
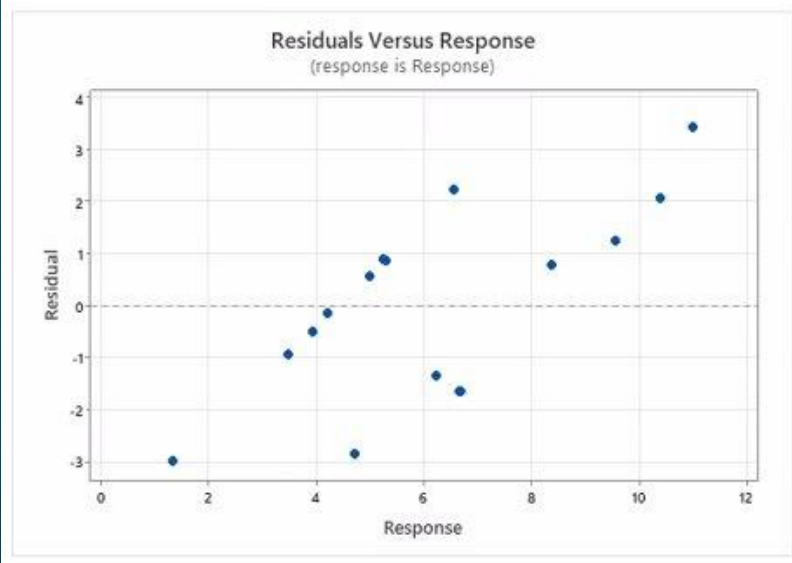
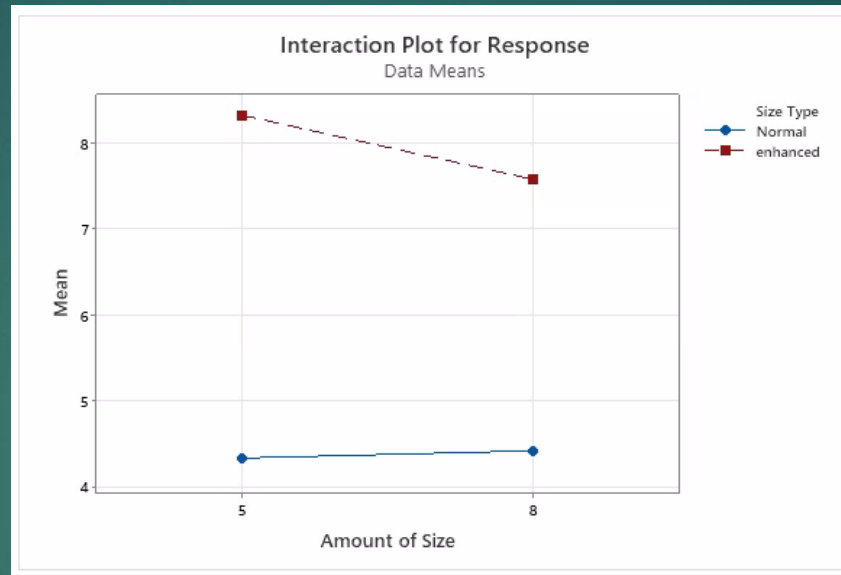
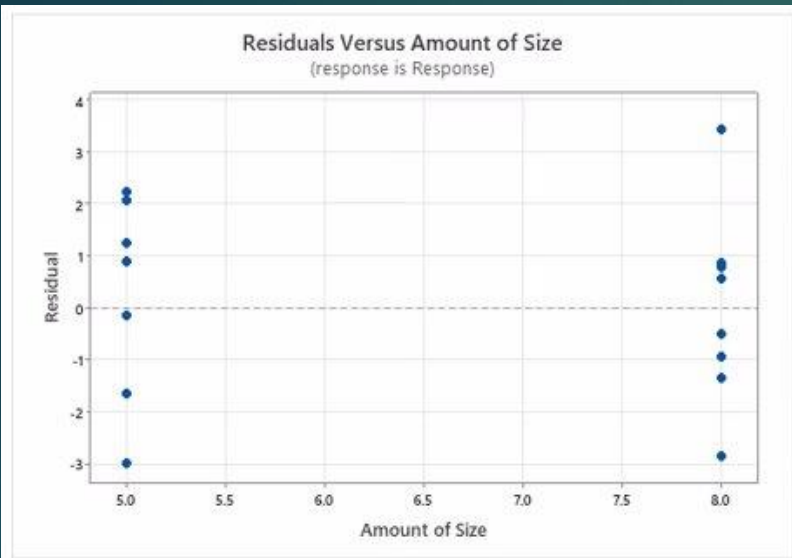
- **Factor A:** Transportation Type
- **Factor B:** Percent Capacity
 - Plotted is the percent effect of the factor
 - Transportation Type has a significant impact indicated with the red square
- The Pareto chart tells us that Transportation Type accounts for most of the total standardized effect
- The Residual Plots allows us to see the normal probability plot, versus fits, histogram of residual frequency, and versus order

Leaning Up Hygiene Supply Packaging Process

- ▶ Define:
 - ▶ Where they pack the Hygiene Supply kits for the Refugees, they were constantly getting behind and since they were in a rush, they would mis-pack the kits
- ▶ Measure:
 - ▶ The amount of time it takes to pack, how many hands each kit touches, distance each kit travels
- ▶ Analyze:
 - ▶ Used statistical analysis to see which factors had an impact on packaging time which caused delays
- ▶ Improve:
 - ▶ Created a Lean, 'U'-Shaped Supply Kit line to reduce distance traveled, the main effect
- ▶ Control:
 - ▶ Continuously time kit making to see if it goes out of control

Solutions

DOE: RESULTS, CONT.



- The interaction plot response shows that the normal and enhanced lines do not intersect
- This indicates that there is no interaction between factors A and B
- In our case this means that **Transport Type** has no interaction with **Percent Capacity**

GAGE R&R RESULTS

The total variance contribution % of R&R was 7.76%, with the remaining 92% being comprised of the actual weight of the ration size.

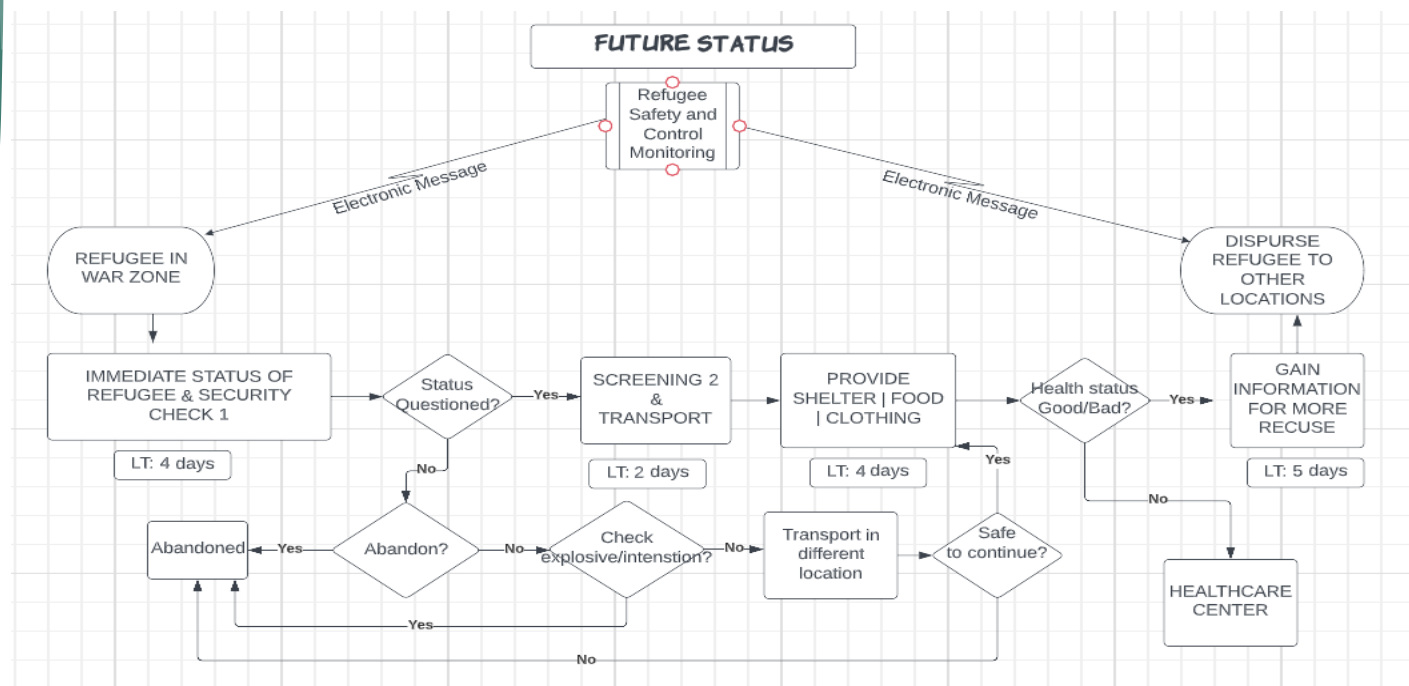
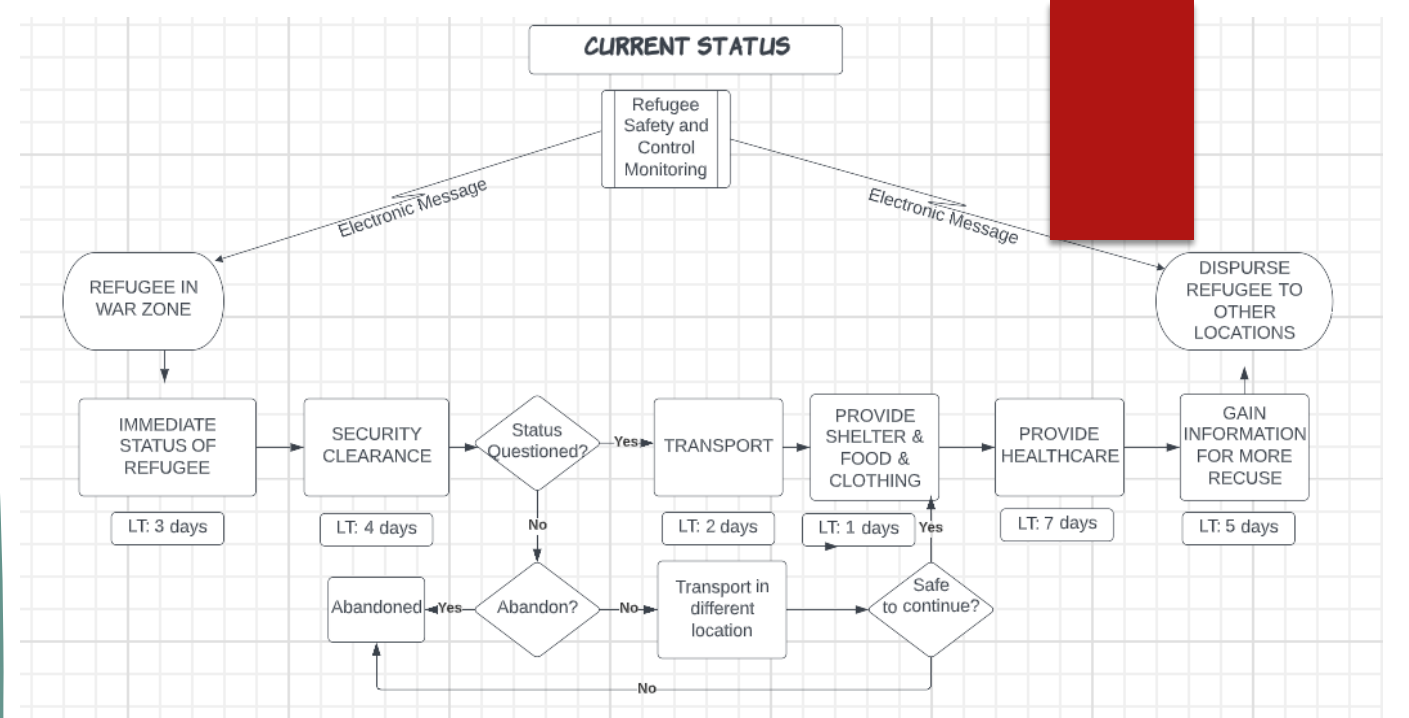
This tells us that the result of our Gage R&R is that our operators and this measurement tool are valid and can measure ration sizes properly.

Variance Components

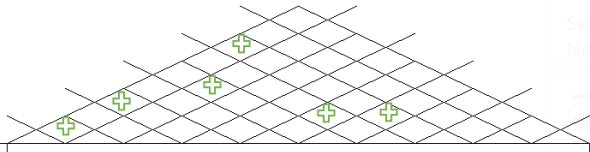
Source	VarComp	%Contribution (of VarComp)
Total Gage R&R	0.09143	7.76
Repeatability	0.03997	3.39
Reproducibility	0.05146	4.37
Operator	0.05146	4.37
Part-To-Part	1.08645	92.24
Total Variation	1.17788	100.00

Value Stream Mapping

- ▶ **Identification of bottlenecks:** By mapping out the entire process, it may become clear where bottlenecks occur in the process of processing war refugees.
- ▶ **Elimination of waste:** Process that do not add value to the overall process, such as redundant paperwork or unnecessary transportation of refugees. By identifying these areas of waste, steps can be taken to streamline the process and reduce costs.
- ▶ **Improved communication and collaboration:** A value stream map can help identify areas where communication and collaboration between stakeholders can be improved. For example, if there are delays in the transportation of refugees, this may indicate a breakdown in communication between transportation providers and other stakeholders.
- ▶ **Opportunities for process improvement:** By analyzing the value stream map, stakeholders can identify opportunities for process improvement and innovation. For example, the use of technology to streamline the processing of refugees or the development of new assessment tools to better identify vulnerable refugees.



Correlations →



Select the snap mode using the Mode butt
New button.

Snapping Tool is moving...

In a future update, Snapping Tool will
be a snap home. Try improved features
like Isotop with Snap & Sketch (or try
Windows logo key + Shift + Q).

Weight:
Strong= 9
Moderate = 3
Weak= 1

QFD Correlation Matrix

Competitive Assessment

		Requirements (How)													
		Safe Transport/Drivers	Local Funding Campaigns	Trained Medical Staff	Security Staff	Legal Staff	Communications	Efficient Border Screening	Efficient Travel Routes						
	Customer Needs (What)	Importance	1	2	3	4	5	6	7	8	9	10	1	2	3
1	Food and Water	3	9	9	1	3	1	3	3	3	9				
2	Shelter and Bed	3	1	9	3	1	1	3	1	1					
3	Health care	2	1	9	9	3	3	9	1	1					
4	Legal Support	2	1	3	1	1	9	9	3	1					
5	Security and Safety	2	9	3	1	9	1	9	3	1					
6	Clothes	1	1	9	1	1	1	3	1	1					
7	Communication of Information	1	9	9	1	1	1	9	3	3					
8															
9															
10															

Target Limits

Refugees reaching asylum per bus	31
Savings achieved from funding	51
Medical Personell per station	17
Security Personell per Station	19
Legal Staff Team handling asylum paperwork	17
Communication Staff	45
Refugees reaching Asylum hour	15
Number of routes working	17
	0
	0

Priority Score

House of Quality

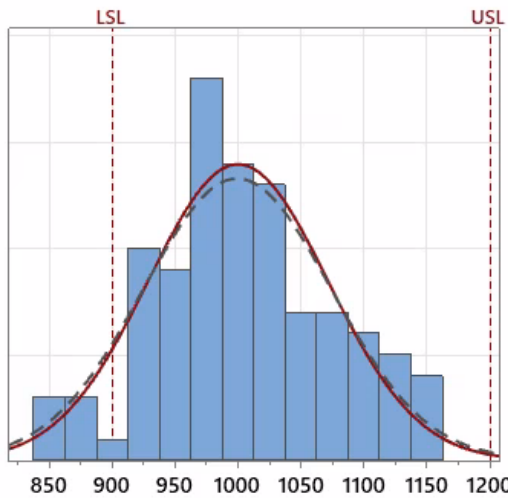


Fixing the Capability of Train Transportation

Process Capability Report for Before

Process Data

LSL	900
Target	*
USL	1200
Sample Mean #	1000
Sample N	100
StDev(Overall)	71.4712
StDev(Within) #	75



— Overall
- - - Within

Overall Capability

Pp	0.70
PPL	0.47
PPU	0.93
Ppk	0.47
Cpm	*

Potential (Within) Capability

Cp	0.67
CPL	0.44
CPU	0.89
Cpk	0.44

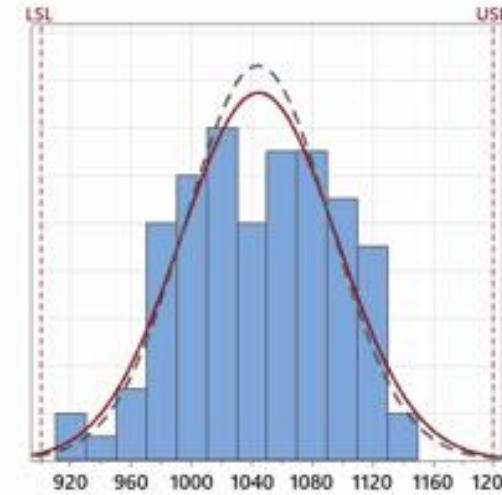
Performance

	Observed	Expected Overall	Expected Within
PPM < LSL	60000.00	80881.85	91211.22
PPM > USL	0.00	2568.39	3830.38
PPM Total	60000.00	83450.24	95041.60

Process Capability Report for After

Process Data

LSL	900
Target	*
USL	1200
Sample Mean	1044.45
Sample N	100
StDev(Overall)	51.5469
StDev(Within)	47.9575



— Overall
- - - Within

Overall Capability

Pp	0.97
PPL	0.93
PPU	1.01
Ppk	0.93
Cpm	*

Potential (Within) Capability

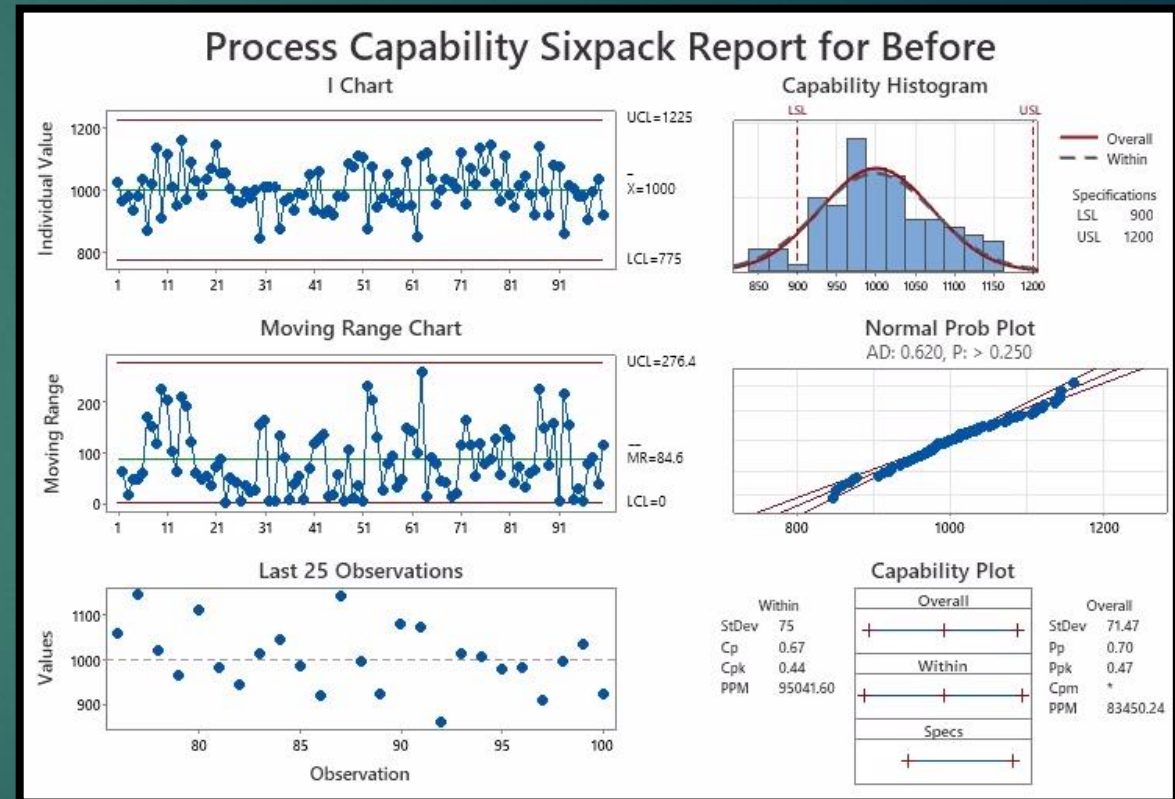
Cp	1.04
CPL	1.00
CPU	1.08
Cpk	1.00

Performance

	Observed	Expected Overall	Expected Within
PPM < LSL	0.00	2536.33	1297.12
PPM > USL	0.00	1274.11	590.55
PPM Total	0.00	3810.44	1887.67

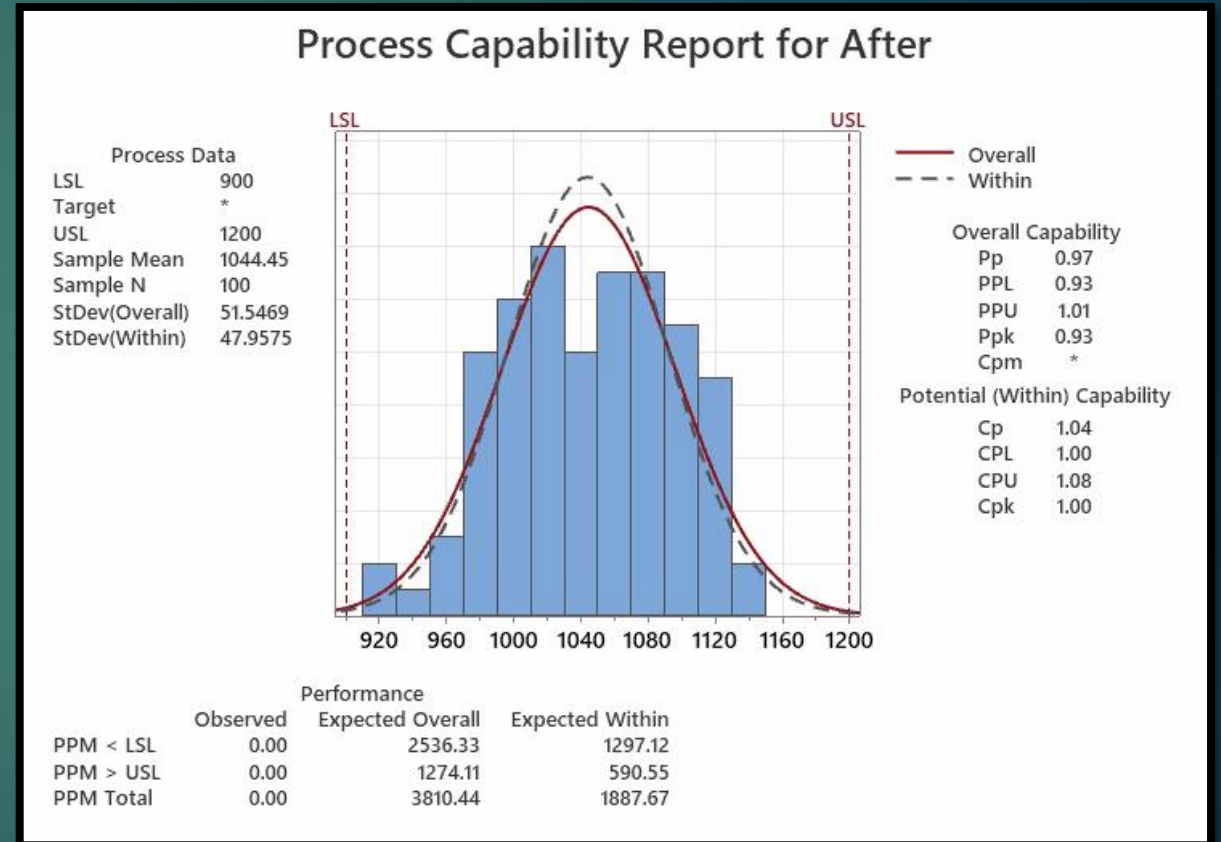
Assumptions and Data

- ▶ We assume the average train carriage in Europe can hold about 75 people. The average train carriage is 25m long, and the average train station platform is 400m long. This means there will be 16 cars x 75 people = **1,200** people per train (**UCL**).
- ▶ We will set the **LCL** at **900** passengers, and the **mean** at **1,000** passengers. This will represent our data before we begin improving the process.



After Improvement and Conclusions

- ▶ After improvements we are able to carry 50 more people in the train by increasing the sample mean.
- ▶ The standard deviation is reduced by 25% which also reduces variability in the data.
- ▶ Overall, the C_p has changed from 0.67 to 1.04 but there is still room for improvement as our goal is to achieve a C_p of 1.3



Acceptance sampling

- ▶ Sampling Plan Parameters
- ▶ Lot size, N (total number of refugees which fail at the screening) = 500
- ▶ α probability (producer's risk) = 0.02
- ▶ β probability (consumer's risk) = 0.25
- ▶ AQL (acceptable quality level) = 0.01
- ▶ LTPD (lot tolerance percent defective) = 0.05

Lot size= 500 Normal
Inspection = General
inspection levels II Plan:
H

ABC- 105, NFX 06-022, DIN 40.080, UNI 48-42
SAMPLE SIZE CODE LETTERS

Lot or Batch Size			Special inspection levels				General inspection levels		
			S-1	S-2	S-3	S-4	I	II	III
2	to	8	A	A	A	A	A	B	
9	to	15	A	A	A	A	B	C	
16	to	25	A	A	B	B	C	D	
26	to	50	A	B	B	C	D	E	
51	to	90	B	B	C	C	E	F	
91	to	150	B	B	C	D	F	G	
151	to	280	B	C	D	E	G	H	
281	to	500	B	C	D	E	F	H	
501	to	1200	C	C	E	F	J	K	
1201	to	3200	C	D	E	G	H	L	
3201	to	10000	C	D	F	G	J	M	
10001	to	35000	C	D	F	H	K	N	
35001	to	150000	D	E	G	J	L	P	
150001	to	500000	D	E	G	J	M	Q	
500001	and	Over	D	E	H	K	N	R	

Table II-A—Single sampling plans for normal inspection (Master table)

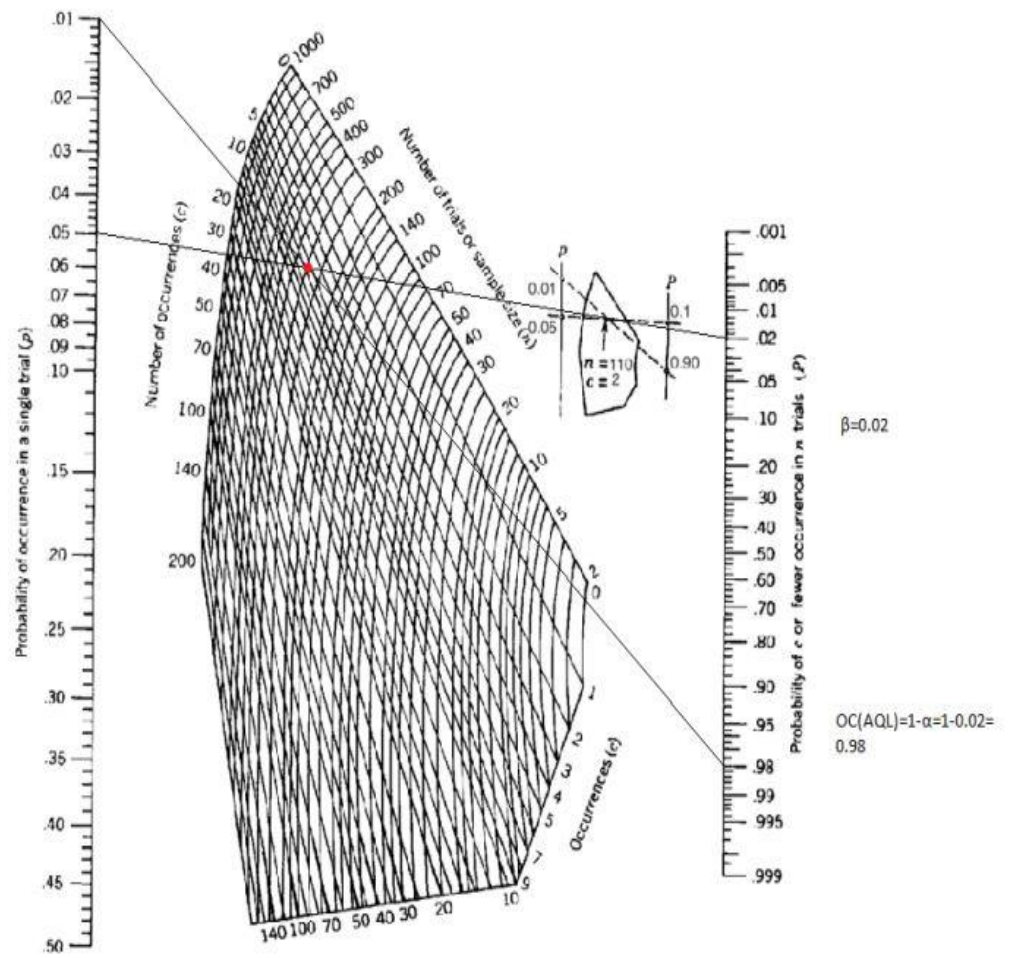
(See 9.4 and 9.5)

Sample size code letter	Sample size	Acceptance Quality Limits, AQLs, in Percent Nonconforming Items and Nonconformities per 100 Items (Normal Inspection)																									
		0.010	0.015	0.025	0.040	0.065	0.10	0.15	0.25	0.40	0.65	1.0	1.5	2.5	4.0	6.5	10	15	25	40	65	100	150	250	400	650	1000
A	2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
B	3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
C	5	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
D	8	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
E	13	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
F	20	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
G	32	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
H	50	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
J	80	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
K	125	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
L	200	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
M	315	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
N	500	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
P	800	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Q	1250	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
R	2000	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓

↓ = Use the first sampling plan below the arrow. If sample size equals, or exceeds, lot size, carry out 100 percent inspection.
 ↑ = Use the first sampling plan above the arrow.
 Ac = Acceptance number.
 Re = Rejection number.

AQL=0.01

LTPD=0.05



Code Letter= H AQL= 0.01 ∴ use 1.0 Sample Size= 50 Ac= 1 Re= 2

	ANSI	Nomo graph
Sample Size (n)	80	300
Occurrences	Ac= 1 Re= 2	C=4

PLAN TO CONTROL

Monitor the progress of the project and adjust as necessary

This could include tracking the number of refugees who have received assistance and monitoring the effectiveness of the solutions implemented

Develop a plan to sustain the improvements made by setting up infrastructure and procedures

Develop a Change management system & Process control plan

Conclusion



There was an opportunity of improvement identified in Refugee's resettlement process to simplify several identified processes and make them more efficient.



Lean tools such as Value Stream Map and Root Cause Analysis helped us to identify waste, reduce processing times and eliminate causes of failures.



This proposal serves a proof that Quality Engineering tool are not only limited to the industry. They can be widely used to analyze and solve social problems.



References

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