

# Lean Six Sigma Green Belt Certification Course

DIGITAL  
OPERATIONS





## Project: Analyze Phase



# Analyze Phase

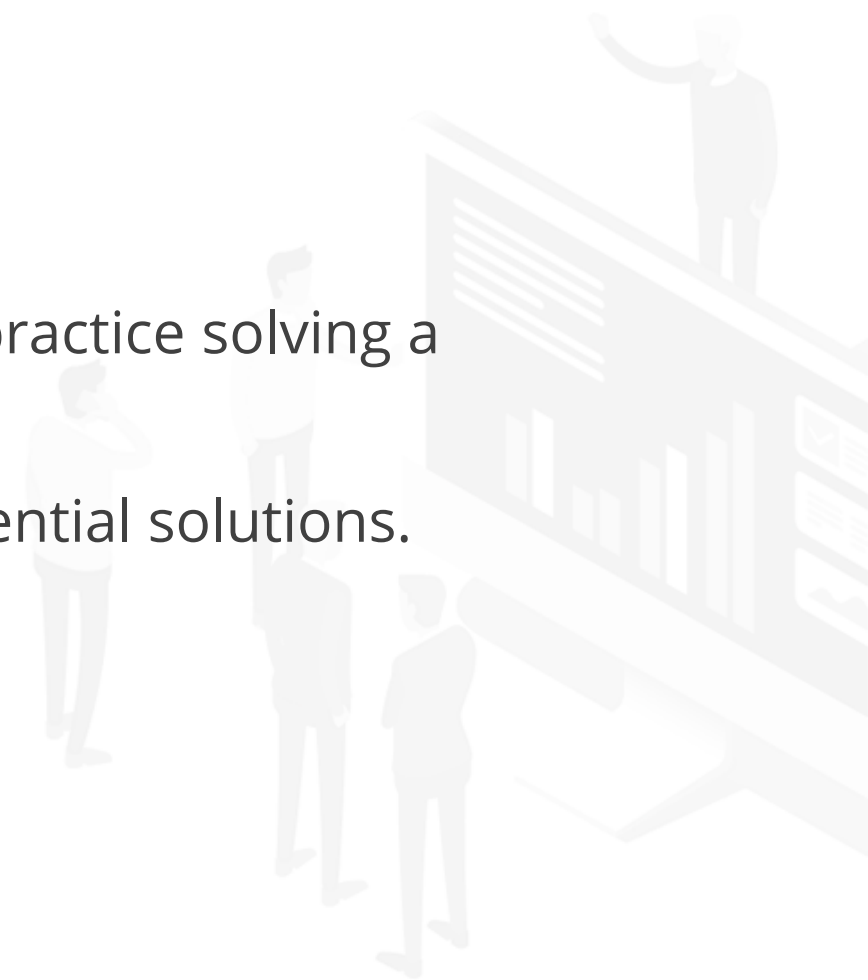
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This case study is a project simulation. As we complete each Phase of the DMAIC (Define, Measure, Analyze, Improve, and Control) process, different aspects of the case study will be presented to you. You will be given background information, instructions, data sets, project updates, and all necessary information to work through each step of the project and answer questions.

## **Note:**

You will be using only some of the DMAIC tools and techniques in the case study to practice solving a single problem.

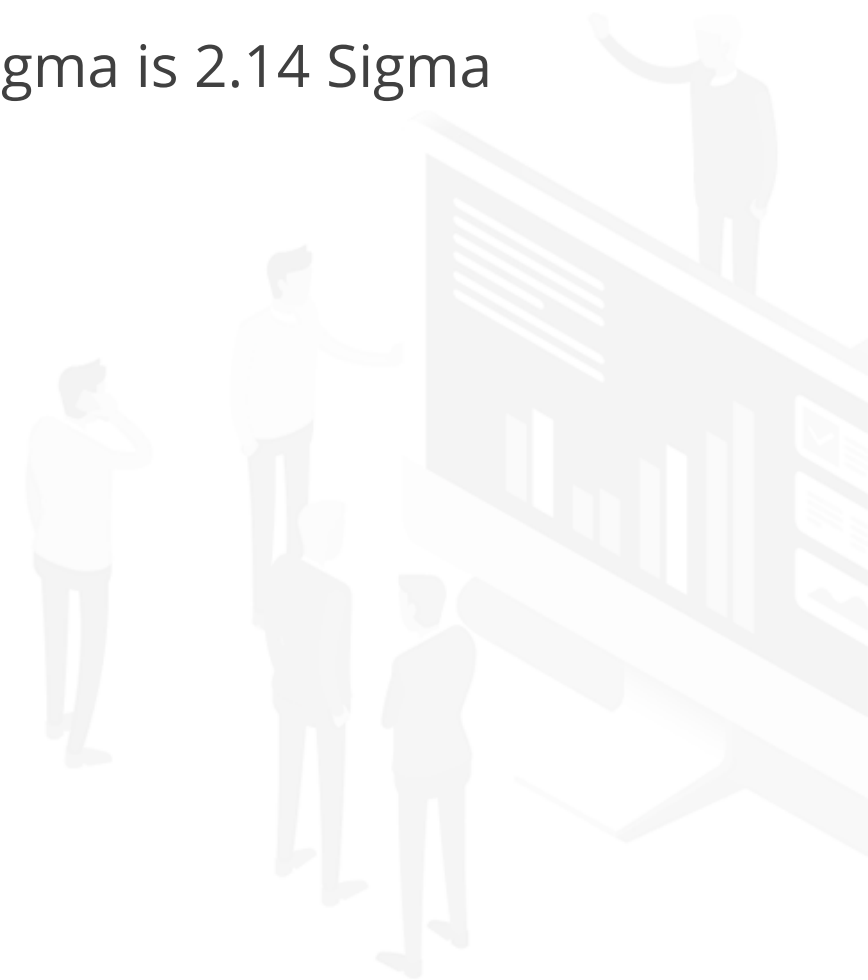
The provided solutions are not the “perfect” answers; they are only one of many potential solutions.



## Project Update: Outcome Summary

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Your team has completed the Define and Measure phases. Based on the Pareto chart, your team identified the primary defect for the process as any difference of serial numbers between fleet records and invoices received from the vendors. The scope of the project was narrowed to improve the match of the serial numbers between fleet records and vendor invoices. Baseline process sigma is 2.14 Sigma and the team's goal is to improve to 3.0 Sigma.



# Project Update: Root Cause

Your team explored several theories on what might be major contributors to the problem but needed to test the theories with data. You studied the report or way to stratify the data. The team decided to test the theory that there is no difference in defect rates between divisions. The team broke down the data by division and then by entries on the fleet report that contain errors and entries that do not contain errors.

	Divisions								
	EAA	EAM	EAS	EX	MW	NE	NW	SW	WC
W/Errors	192	98	85	26	370	164	102	110	155
No Errors	643	705	495	93	5	223	201	452	906

# Analyze Phase Questions

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1. What should be the outcome(s) of the Analyze Phase?
2. Is the input data continuous or discrete?
3. Is the output data continuous or discrete?
4. Based on data types, what type of hypothesis test should you run?
5. Run the test your team identified.
6. What did your team discover with the hypothesis testing?
7. Based on your findings, what should be your next plan of action?





# Analyze Phase Answers

1. The outcome of the Analyze Phase is to identify the root cause of the issues or errors.
2. Input data is discrete.
3. Output data is discrete.
4. Based on the data types, the Chi Square test is appropriate.
5. The Chi Square Test results from Excel are listed here:

	Divisions									
Actual	EAA	EAM	EAS	EX	MW	NE	NW	SW	WC	Total
W/Errors	192	98	85	26	370	164	102	110	155	1303
No Errors	643	705	495	93	5	223	201	452	906	3723
Total	835	803	580	119	372	387	303	565	1062	5026
Expected	EAA	EAM	EAS	EX	MW	NE	NW	SW	WC	Total
W/Errors	216	208	150	31	96	100	79	147	275	1303
No Errors	619	595	429	88	276	287	225	419	787	3723
Total	835	803	580	119	372	387	303	565	1062	5026
CHI Square Test =	1.0525E-277	< .05	The defect percentage is NOT independent of division							
=CHISQ.TEST(Actual Array, Expected Array)										

## Analyze Phase Answers

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6. The team discovered that the divisions were a significant factor in the defect percentage.
7. Based on the findings, the team should explore why the divisions are not the same in defect frequency. Also, the team should statistically test other theories to find what is causing the billing defects.





## Project Update: Additional Factors

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The team decided to further investigate the situation and discovered additional contributing factors as noted:

- Vendor had inconsistent definition of serial number
- Your company had inconsistent definition of serial number
- Input process is manual
- Lag in receiving data

The team identified the significant X's . Upon completing the Tollgate Review Meeting with the Champion, you are allowed to proceed with the Improve Phase.

