

Improve HTS and Schedule B Classification Process to Reduce the Turnaround Time in a Commodity Shipments Compliance Project

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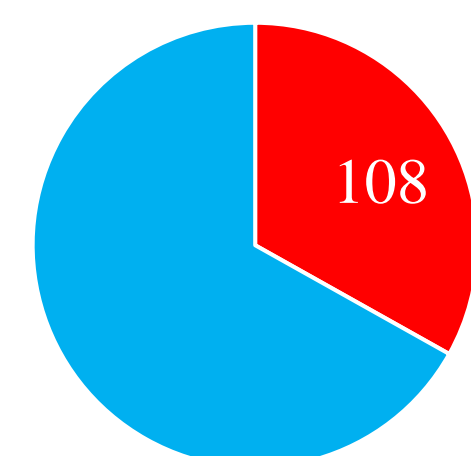


Abstract

The HTS and Schedule B classification process adds two days to the turnaround time of the standard process of the Commodity Shipments Compliance team. Throughout 2021, 108 of 326 requests approvals requiring HTS and Schedule B classification took longer than three days. A process improvement has been made using the Lean-Kaizen methodology. As Lean-Kaizen tools, DMAIC and Value Stream Mapping were worked together to obtain efficient results. As a result, one delay, three waiting times, and seven kaizen bursts were identified. Twelve corrective actions were proposed for process improvement. The future VSM results reflect that the maximum lead and waiting times are reduced from almost 11 days to one day. These time reductions will help with the 50% goal of time reduction proposed for the classification process and the 33% reduction goal for the total turnaround time in the request approval process.

Introduction

- HTS and Schedule B classification adds two days to the turnaround time of the standard process.
- It has been made a process improvement to the HTS and Schedule B classification process using Lean-Kaizen, to comply with the turnaround time and on-time delivery of the requests that require HTS and Schedule B classification.
- In one year, a total of 108 of 326 requests requiring HTS and Schedule B classification took longer than three days.



Background

- An engineering team requests approved export invoices of commodities for international export shipment compliance.
- Turnaround time urgent request one day; if the request is not urgent, the turnaround time is two days.
- When any commodity of the invoice requested requires HTS and Schedule B classification, an additional process is required prior to the approval to comply with the process.
- The classification process adds two days to the turnaround time of the standard process.
- Lean-Kaizen concept help S. Kumar, A. Dhingra, B. Singh [1] to reduce the inventory level, delivery time, and cycle time, eliminate rework, improve productivity, and improve product quality in some enterprises in India.
- If combine the waste elimination and increased efficiency focus of lean manufacturing with the continuous improvement of the Kaizen concept, therefore Lean-Kaizen method develops a continuous elimination of waste and efficiency increment.

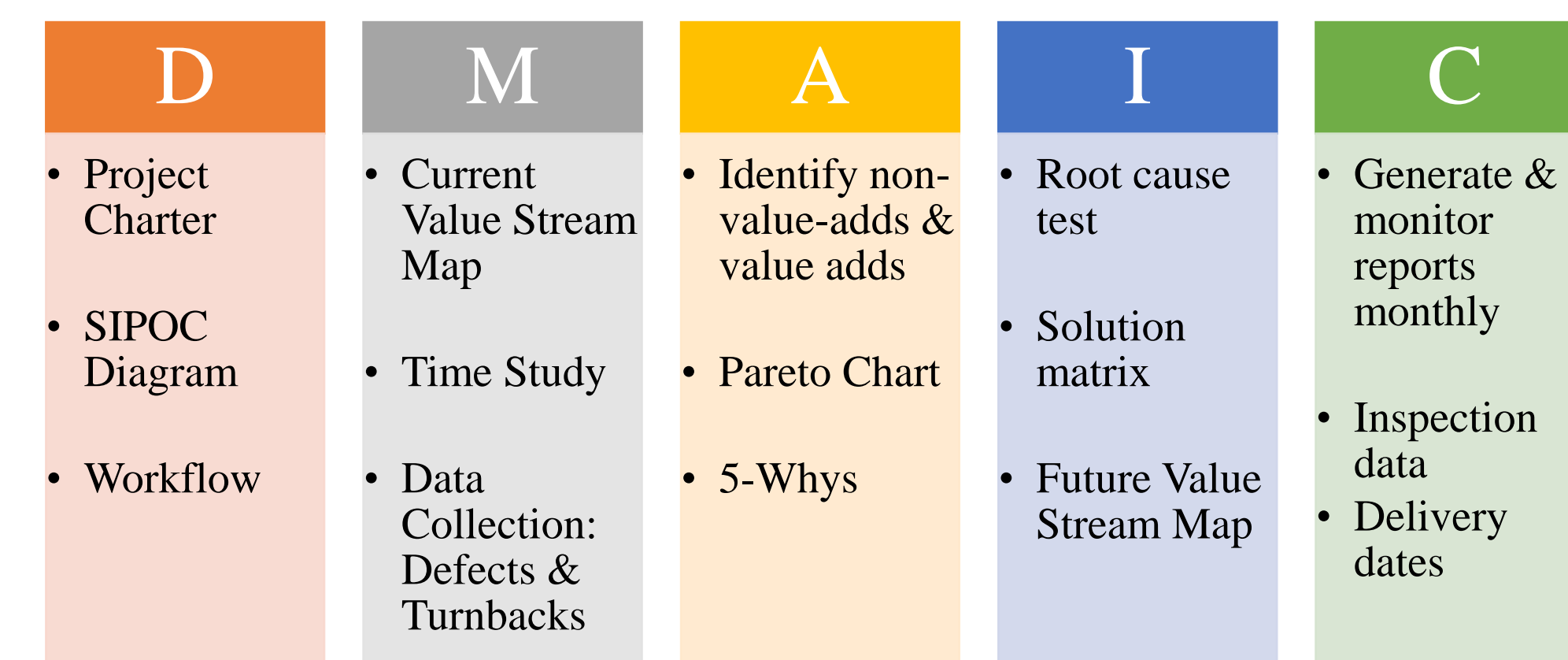
Problem

The objectives of this study:

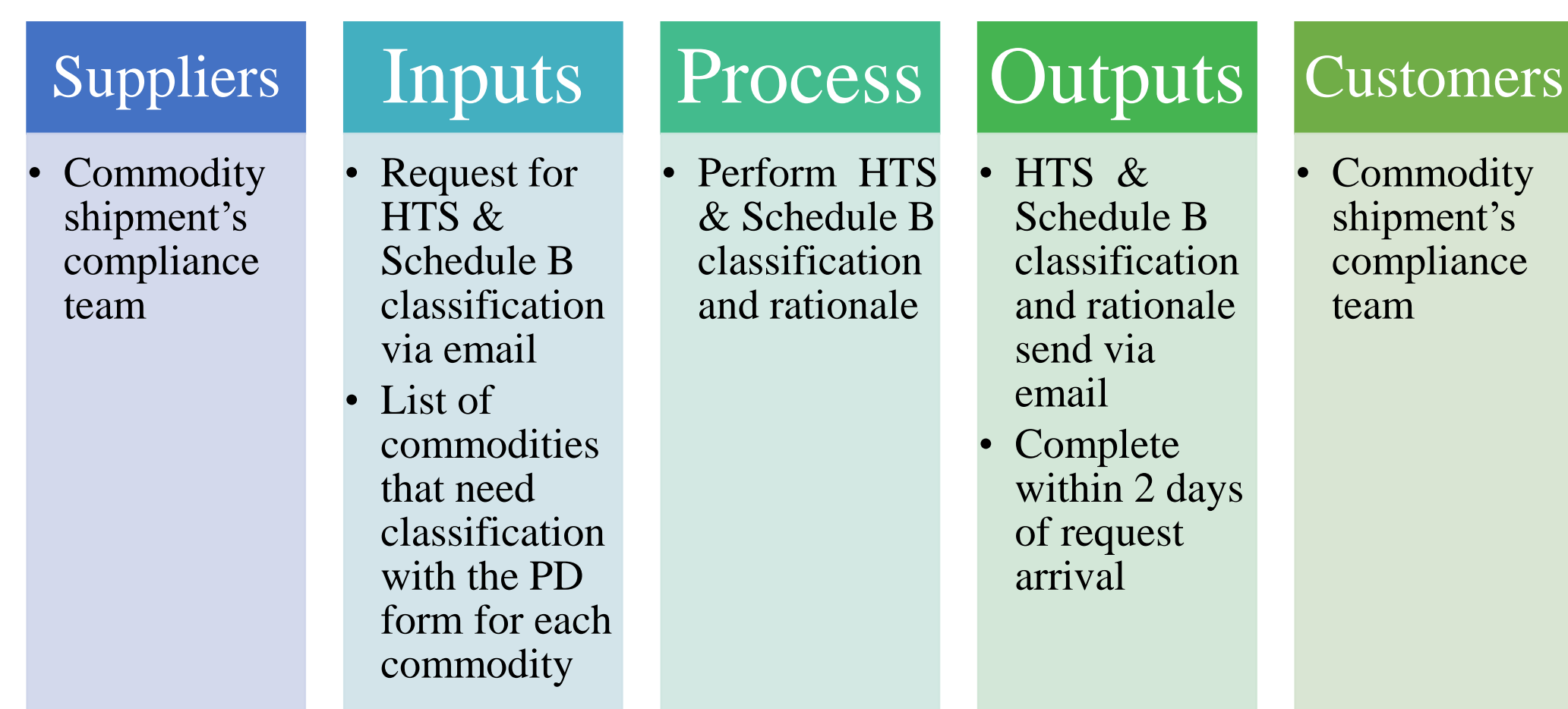
- Comply with the Commodity Shipments Compliance project quality metrics
- Be able to reduce the completion time of the classification process from 2 days to 1 day, 50% reduction
- Reduce turnaround time of the requests that required classification from 3 days to 2 days, 33.3% reduction
- Update the standard work and work instructions
- Provide employees the necessary databases access
- Reduce the defects and time caused by rework
- Comply with the turnaround time and on-time delivery of both projects
- Comply with the engineering team's expectations and needs.

Methodology

Execute DMAIC strategy and Value Stream Mapping methodology to reach this study goal. DMAIC is an excellent approach to managing a process that needs improvements.



Results and Discussion

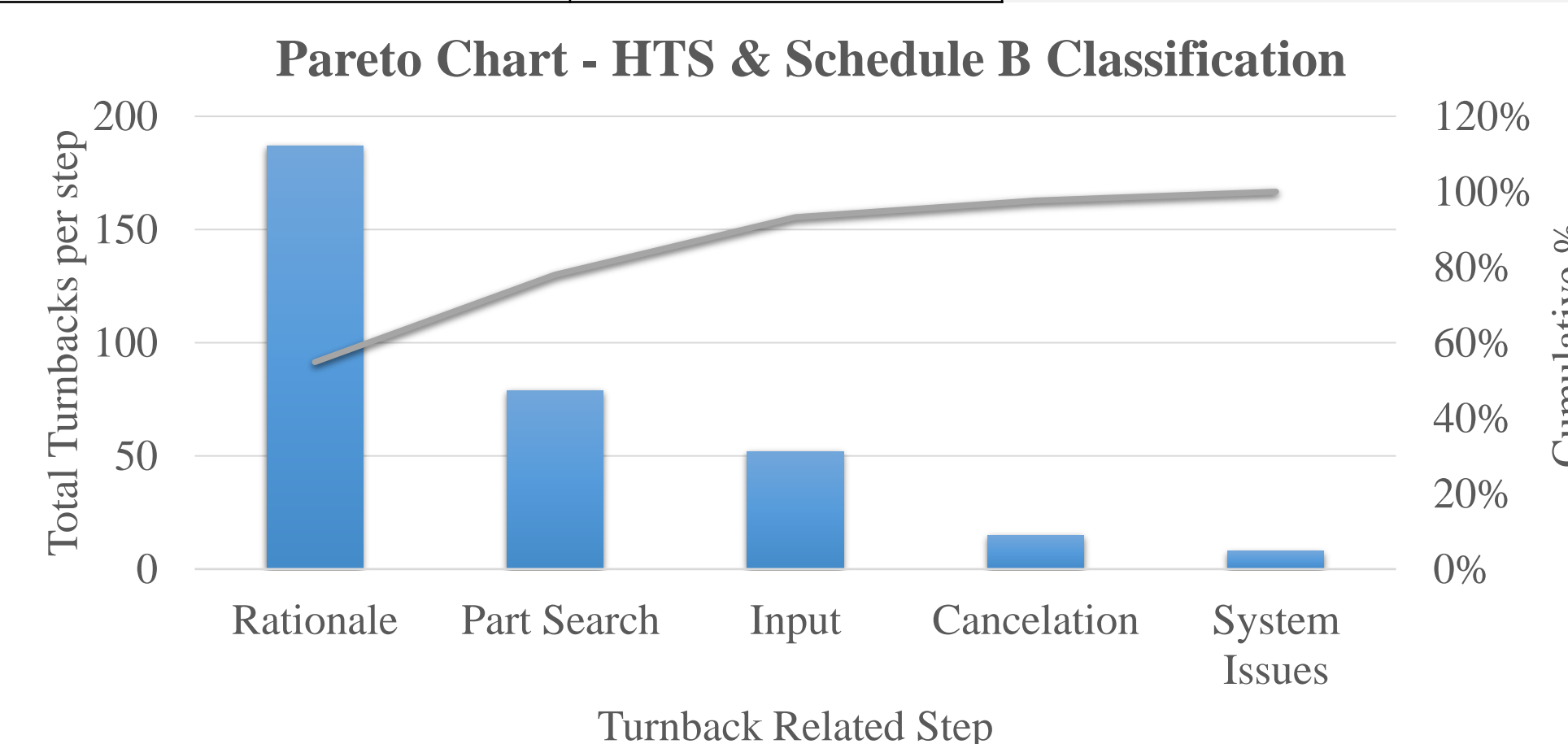


- The workflow map visualizes and validates the sequence of events in the current HTS & Schedule B classification process.
- Employees of each role were selected to provide the minimum, and maximum time in minutes it takes to complete each step in the process.

HTS - Waiting Times					HTS - Delay
Practitioner	Time [min]	1# Loading pages and tools issues	2# Network or Internet Issue	3# Mentoring or peer review	Waiting Response
Process	Min	0	0	0	0
	Max	240	240	480	14400
Overall	Min	0	0	0	0
	Max	240	240	480	14400

- Value stream Mapping includes the defects found during inspections and turnbacks reported by practitioners

Turnback related step	Total Turnbacks	Total %	Cumulative %
Rationale	187	55%	55%
Part Search	79	23%	78%
Input	52	15%	93%
Cancelation	15	4%	98%
System Issues	8	2%	100%
Total turnbacks	341		



Results and Discussion

- As a result of the analysis of the data collected (Defects, Turnbacks, and Time Study) and Pareto Chart analysis, the Kaizen Bursts were identified.

Kaizen Burst	Description
1	Delay and Waiting Times – TIME
2	Write a Rational Step– DEFECTS
3	Write a Rational Step– TURNBACKS
4	HTS Classification & Schedule B Selection Step–DEFECTS.
5	Part Research Step –TURNBACKS
6	HTS Classification & Schedule B Selection Step– CRITICAL DEFECTS
7	Sub-heading and sub-sub-heading of the part Step– DEFECTS

- 5Why methodology was performed on each Kaizen Burst to identify the root causes and Solution Selection Matrix to prioritize solutions.

	Current State		Future State
	Max (min)	Max (min)	Difference (min)
VSM			
Waiting Time (WT)	15360	1440	13920
Process Time (PT)	150	150	0
Lead Time (LT)	15510	1590	13920
Lead Time Standard deviation (SD)	2962	208	2754
Lead Time Average	3308	1612	1696
	Current State	Future State	Expected reduction
Total Turnbacks	266	134	132
Total Defects	1047	491	556

- After considering the implementation of the improvements, the lead time was reduced from 15510 minutes to 1590 minutes.
- The expected reduction in turnbacks is 132 and the expected reduction in defects is 556.
- Lead Time Standard deviation (SD) from the current process was 2962 and the SD from the future process is 208.
- The significant decrease in the standard deviation value tells us that the future process is much more robust and has less variability; this indicates that implementing the improvements positively contributed to the classification process.

Hypothesis Test Results		
Test with Unknown Variance (Student T Distribution)		
Sample	A	B
Std. Dev.	2962	208
X Bar	3308	1612
N	25	25
T exp		2.86
V		24.0
Pvalue		0.0044
Alpha		0.05

Hypothesis Test Results		
Test Variance of two Populations (F Distribution)		
	A	B
Sigma	2962	208
V	24	24
F exp		202.79
Pvalue		0.000
Alpha		0.05

Results and Discussion

- $H_0: \mu_a = \mu_b$ and $H_1: \mu_a > \mu_b$
- The mean hypothesis support that the lead time mean of the current process is greater than the lead time mean of the future process, which indicates that there was a significant reduction in lead time.
- $H_0: \sigma_a = \sigma_b$ and $H_1: \sigma_a > \sigma_b$
- The variance hypothesis support that the variance of the current process is greater than the variance of the future process, which indicates that the process is now more consistent.

Conclusions

- During this design project, the HTS & Schedule B classification process was studied for improvement
- The Current and Future value stream mapping results can be emphasized that the maximum lead and waiting times are reduced from almost eleven days to one day. These time reductions will support the 50% goal of time reduction proposed by the classification process and the 33% reduction goal for the total turnaround time in the request approval process.
- The hypothesis tests validate that the proposed and implemented improvements are effective.
- The standard deviation and variance values shows us that the future process is much more robust and has less variability; this indicates that implementing the improvements positively contributed to the classification process.
- The defects are expected to be reduced but not eliminated.
- Overall turnbacks reduction will be 50% or more, and it is expected to reduce critical defects on inspections that will be reflected in the next months of data.
- Cost reduction expectations: \$16,168
 - Turnbacks Reduction 50% = \$9,388
 - Delay Reduction = \$6,215
 - Waiting time reduction = \$ 565

Future Work

- Complete the improvement implementation in the classification process
- Monitor the future process to identify new or persistent areas of opportunity for continuous improvement in this process.

Acknowledge

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References

[1] S. Kumar, A. Dhingra, B. Singh, "Process improvement through Lean-Kaizen using value stream map: a case study in India." International Journal of Advanced Manufacturing Technology. May2018, Vol. 96 Issue 5-8, p2687-2698. 12p.