START-UP CHECKLIST MIGRATION TO UNIVERSAL DATA COLLECTION SYSTEM (UDCS)

Maricel Enciso
Gay Ann Escasinas
Ma. Erika Joy Lalatag
Mariel Kayneth Ramos

Assembly Manufacturing, Technical Learning and Development & IT & Smart Manufacturing
Allegro Microsystems Philippines Inc.
4756 Sampaguita Street Marimar Village Brgy. Sun Valley Parañaque City, Philippines
menciso@allegromicro.com, gescasinas@allegromicro.com,
elalatag@allegromicro.com, mramos@allegromicro.com,

ABSTRACT

Assembly Manufacturing in Allegro Microsystems Philippines Inc is committed to contribute on the cost saving initiative through seeking continuous improvement on the production line. The high consumption of paper was observed by the team that led us to provide ways to minimize the use of paper wherein 48% of paper consumption which is equivalent to Php39,442 are used for the start-up checklists alone. The traditional paper-based form that is outdated in today's fast-paced digital age considers us to go in transition to digital form.

To find a solution to the problem, different methodologies were used such as Data Gathering, Pareto Chart, Fish Bone Analysis and 3x5 Why Analysis. These methods help us to address the issue and provide the best solution for the reduction of papers on the production line.

The Pareto Chart shown in Fig 1, shows that 48% of paper was used for the start-up checklist which is accomplished through manual data entry since the existing manufacturing execution system has limitation that cannot cater the machine start-up checklist.

The result reveals that the best solution to reduce the consumption of paper is to automate the form using Universal Data Collection System as it is a system that caters to the needs of the start-up checklist. Universal Data Collection System or UDCS for short is a company-wide system that is user friendly and requires no coding when generating forms. The system is very accessible to all tablets and computer terminals of the company. One feature of UDCS that is very applicable for the start-up checklist is it can validate incomplete fill-up during submission.

In conclusion, the automation of start-up checklist through migration to Universal Data Collection System provide a significant improvement on:

(a.) Cost Avoidance, in which to reduce paper usage by 48% equivalent to Php39,442 in a year on the Start-Up Checklist by FY24, (b.) provides Fool Proofing (Poka Yoke) to prevent submission of incomplete data entry which can be a potential audit finding, (c.) To digitize the form and eliminate manual fill-out of data. (d.) Work Simplification as it helps to eliminate administrative activities in terms of withdrawal, distribution, and collection of Start-Up Checklist that will increase efficiency in filing system.

1.0 INTRODUCTION

1.1 Background of the Study

Assembly production consumes a high number of papers in the line and part of the operator's activity is to accomplish the different checklist.

Based on Pareto Chart (Fig. 1), it shows that the highest paper consumption for Assembly was used for start-up checklist and serves as the main contributor for the high consumption of paper.
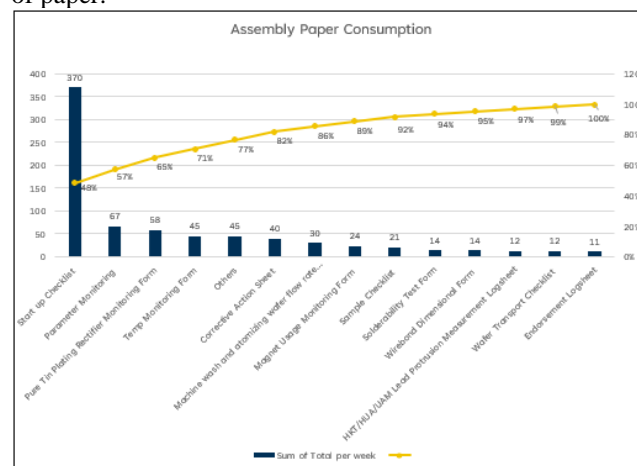

Fig. 1. Assembly Paper Consumption

48% of consumption of papers in Assembly is due to start-up checklist, which is equivalent to Php39,442 annually.

With the goal of the company for continuous improvement and drive for digital Allegro, our aim is to contribute to cost reduction at this current challenging business conditions and one way is to minimize the use of paper at Assembly.

1.2 *Objective*

The goals of this project are (a.) Cost Avoidance, in which to reduce paper usage by 48% equivalent to Php39,442 in a year on the Start-Up Checklist by FY24, (b.) provides Fool Proofing (Poka Yoke) to prevent submission of incomplete data entry which can be a potential audit finding, (c.)To digitize the form and eliminate manual fill-out of data. (d.) Work Simplification as it helps to eliminate administrative activities in terms of withdrawal, distribution, and collection of Start-Up Checklist that will increase efficiency in filing system.

1.3 Scope

The scope of the project will cover stations at Assembly only.

2.0 REVIEW OF RELATED WORK – NOT APPLICABLE

3.0 METHODOLOGY

Our team used several methodologies to identify the problem and figure out possible improvements. We gathered data and analyzed using Pareto Chart, Fishbone Diagram, Root Cause Analysis, and 3 x 5 Why Analysis. With these activities we can now determine the root cause of the problem.

Fig. 2. – Different Methodology Used in Determining the Problem

3.1 Root Cause Determination

Using Fishbone Diagram and 3x5 Why Analysis (Fig 3 and 4), the team identified possible causes related to high consumption of paper used for Start-Up Checklist.

In fig.3 based on the Fishbone Diagram, the potential cause of high consumption of paper used for Start-Up Checklist is due to the limitation of the current Manufacturing Execution System (MES) of Assembly.
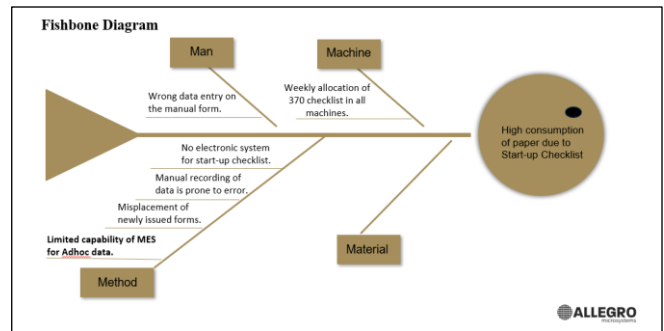

Fig. 3 – Fishbone Diagram of High Consumption of Paper

3 x 5 Why analysis shows that the manual recording of data through paper forms is due to the limitation of the current MES that cannot cater the machine start-up checklist data and only accommodates the lot related data collections.

Fig. 4 – 3x5 Why Analysis of High Consumption of Papers

Based on the analysis the main cause of the high consumption of paper is due to the limited capability of MES for start-up checklists.

3.1 Root Cause Improvements

Based on the identified problems, the team created improvements that could help resolve the identified root cause. Table 1 illustrates the identified problems in each category.

Table 1. Problem and Improvement Actions

Item	Problem	Improvement
MACHINE	High usage of paper as forms are provided on individual machines	Use of digital form
MAN	Wrong data entry on manual forms	Use of digital form
METHOD	No electronic system for start-up checklist Prone to error due to manual recording Misplacement of forms Limited capability of MES for data collection	Use of digital form

From the problems that were identified, the team assessed and listed possible software applications during data gathering as shown on Table 2.

Table 2. List of Software Applications that can possibly address the problem:

Application	Advantages	Disadvantages
Microsoft Excel	✔ Easiest way to transfer from manual form. ✔ No coding is required	✔ No timestamp of data recording ✔ No access during system down ✔ Limited Access on computer terminals ✔ No reminder to operators to accomplish the form ✔ Not fool proofing
MES (Camstar)	✔ Accessible to all computer terminals	✔ Limited capability of camstar ✔ No access during system down ✔ Coding is required
Work Automation Tool (WAT)	✔ Accessible to all computer terminals ✔ No coding is required	✔ Not applicable as it requires process flow with approval (no approval required for start-up checklists) ✔ No reminder to operators to accomplish the form ✔ No access during system down
Universal Data Collection (UDCS)	✔ Accessible to all computer terminals and tablets ✔ No coding is required ✔ With control features to prevent submission of incomplete data ✔ With timestamp of data recording	✔ No reminder to operators to accomplish the form ✔ No access during system down

Out of the four (4) listed software applications, the team arrived on the best solution that is applicable to use which is the **Universal Data Collection** due to the following reasons: (1) it has a control feature that can prevent incomplete data entry; (2) accessibility to all computer terminals and tablet; (3) no coding is required during creation of forms; and (4) has the capability to reflect the timestamp of recording.

4.0 RESULTS AND DISCUSSION

The main goal of this project is to reduce the paper consumption at Assembly operation. Weekly consumption of papers for manual form is around 760pcs for Assembly and it will be reduced by 48% equivalent to 370 papers.

Fig. 5a, shows the start-up checklist paper form used at Assembly. While Fig. 5b shows the digitized form after the migration to UDCS. Data recording is now digitized and easily accessible to the production floor.

Fig. 5a.

Fig. 5b.

With the team's effort and combined ideas, the team managed to reduce the Paper Consumption. In effect we can able to save Php 39,442 annually. Fig. 6 shows the cost-saving impact of the project.

Papers and printing cost savings for electronic migration of start-up checklist			
	Total Production Checklist (in pcs.)	Start-up Checklist (in pcs.)	Total reduction (in %)
Paper Consumption (Weekly)	763	370	48%

	No. of Papers/ week	Cost/Unit (Php)	Weekly (Php) Cost	Yearly(Php) Cost
PAPER COST	370	1.45	536.5	27,898.00
PRINTING COST	370	0.60	222	11,544.00
Estimated Total Savings	370	2.05	758.5	39,442

Fig. 6– Papers and Printing Cost Savings

5.0 CONCLUSION

In conclusion, the project made us realize that migration to electronic forms has an impact on improving data integrity as well as cost-savings. With the digital transformation in the business operation, the use of E-forms through Universal Data Collection System is the best solution as it provides an Environmental Impact by reducing paper consumption by 48%. Cost Saving through reduction of papers and printing cost by Php39,442 annually. It also improves manpower's productivity by work simplification through reduction of manpower activity such as withdrawal, collection, and scanning of filled-out forms.

6.0 RECOMMENDATIONS

We recommend that this project be fanned out to other checklists used at the Assembly Production line to continuously reduce the heavy use of paper. We also recommend that this project be fanned out to other departments and the UDC software be further explored to fully utilize its features.

7.0 ACKNOWLEDGMENT

We would like to express our special thanks to those who have supported this project: Universal Data Collection – Start-Up Checklist, the IT Team for their expert advice and support in completing this project.

Also, our deepest gratitude to our advisers Ms. Ma. Angeli Flores and Cyrels Anna G. Vislenio for their time and effort in giving kind direction, providing proper guidance, and sharing valuable ideas. To Mr. Marcel Valoria, Assembly Training Team and Assembly Production Supervisors thank you very much for the help you have provided. And, to everyone who has contributed in one way or another to this accomplishment, we truly appreciate you all.

Lastly, thank you so much to our Managers: Ms. Cathie R. Rivas and Mr. Ariel Yagin and our Director Mr. Eric Roxas for being a big inspiration to us all, for the moral support and encouragement.

8.0 REFERENCES– NOT APPLICABLE

9.0 ABOUT THE AUTHORS

Maricel Enciso, Senior Production Supervisor with 13 years of experience in Allegro Microsystems Philippines Inc. A graduate of Electronics and Communications Engineering.

Gay Ann Escasinas, Production Supervisor with 10 years of experience in Allegro Microsystems Philippines Inc. A graduate of Bachelor of Engineering.

Mariel Kayneth Ramos, Senior Software Engineer with 4 years of experience in Allegro Microsystems Philippines Inc. A graduate of Information Technology.

Ma. Erika Joy Lalatag, Production Learning and Development Specialist with 13 years of experience in Allegro Microsystems Philippines Inc. A graduate of Industrial Engineering.