IMPROVEMENT OF PRODUCT RELEASE CHANGE ORDER (PRCO) PROCESS THROUGH PIMES SYSTEM INTEGRATION AND DIGITIZATION

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ABSTRACT

A permanent change to a product or process can be made through the Product Release Change Order (PRCO), which can be prompted by modifications to existing parts, cost savings, improved functionality, or product safety. The implementation of this process is very complicated because it is very difficult to monitor the status of each PRCO especially if it is a manual or paper-based process.

ATS Engineering Department introduced the ECC system to digitize the PRCO process by converting paper-based process to digital process to reduce indirect material usage, speed up turnaround time and monitor PRCO statuses.

This ECC system significantly improve the PRCO process and lowers indirect material costs.

1.0 INTRODUCTION

The Product Release Change Order (PRCO) or better known as the Engineering Change Order (ECO) is a process of implementing a permanent change in a product or process. The PRCO Change was triggered when there was a change in existing parts, cost reduction, improvement in product capabilities and/or improvement in safety.

In the ATS Business Unit of PIMES, the PRCO process starts when the customer sends a PRCO notification to the Engineering Department or PRCO Analyst via email. Once it is received, the PRCO Analyst will ask for the reference documents to analyze or check the details of the PRCO and it will create an Engineering Change Notification (ECN) to formally release the PRCO to production and other concern sections and they will be able to properly implement the PRCO or the said change.

The PRCO implementation process is very complicated especially if it is a manual or paper-based process.

The common problems encountered in the implementation of the Manual PRCO are the long set up time due to the manual collection of data, non-transparent status of the PRCO, high turnaround time in the implementation of action items and very time consuming in the treatment of those implemented. action items. Since PRCO is still paper-based, its indirect material consumption is also high such as paper, ink and other office supplies.

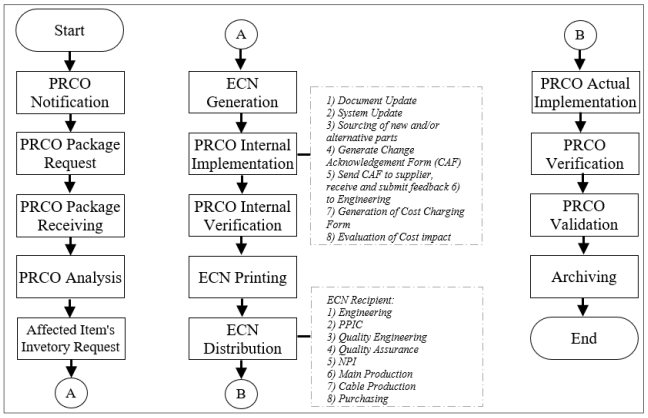


Figure 1: Current PRCO Process Flow

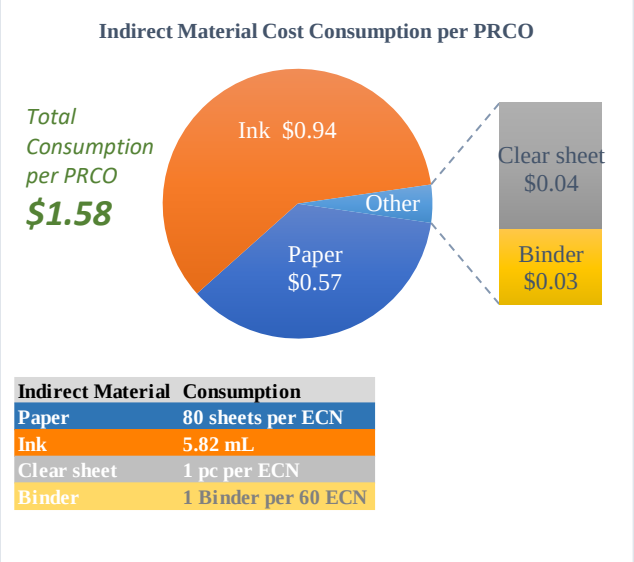
1.1 ECN Releasing Average Turnaround Time

Figure 2 shows that the PRCO TAT from the generation of the ECN to the releasing of document consumes 17 days. It has long turn-around time because other PRCO action items such as revising the document, updating the system or file and/or sourcing new items need to be completed first.

Figure 2: Turnaround time result from June 2022 to June 2023

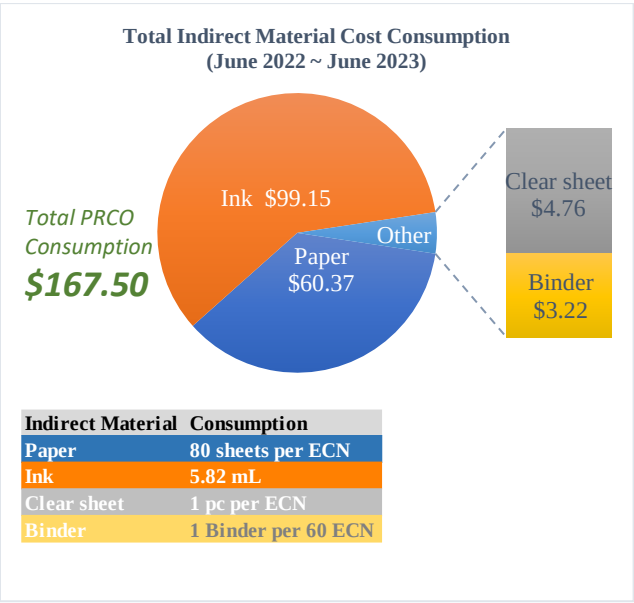
1.2 PRCO Indirect Material Cost Consumption

Based on the calculated cost of PRCO, each PRCO consumed $1.58 (refer to figure 3) and the entire consumption of PRCOs from June 2022 to June 2023 totals is $167.50 (refer to figure 4).



Indirect Material	Consumption
Paper	80 sheets per ECN
Ink	5.82 mL
Clear sheet	1 pc per ECN
Binder	1 Binder per 60 ECN

Figure 3: Indirect Material Cost Consumption per PRCO



Indirect Material	Consumption
Paper	80 sheets per ECN
Ink	5.82 mL
Clear sheet	1 pc per ECN
Binder	1 Binder per 60 ECN

Figure 4: Total Indirect Material Cost Consumption

Because of this, the ATS Engineering Department presented the ECC system, which would digitize the PRCO process to decrease indirect material consumption, speed up process turnaround time, and monitor PRCO status

1.3 Engineering Change Control (ECC) System Overview

The ECC System is a digital library that is connected with the PIMES System and converts paper-based documents to digital documents that can be readily accessed and monitored by the concern sections.

This system will help to eliminate the printing and document distribution process and it will also speed up the turnaround time of PRCO or ECN documents releasing to other sections.

1.3.1 ECC System Process Flow & Current Process

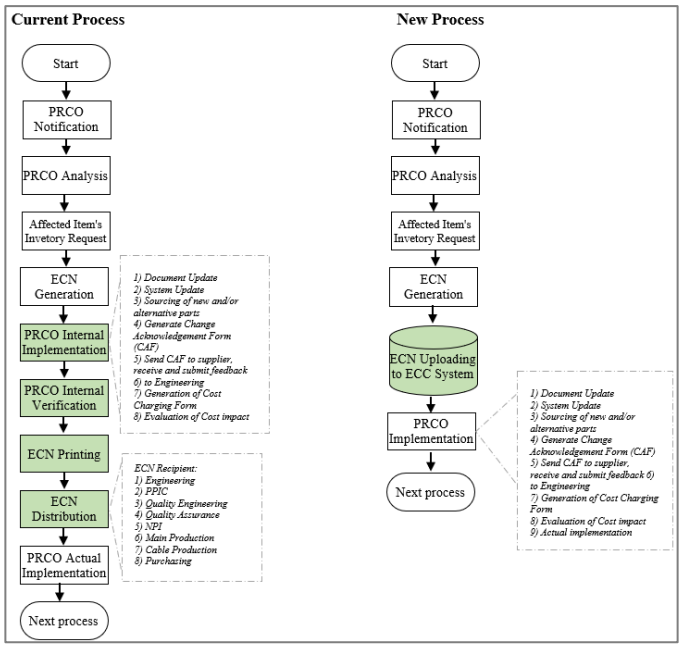


Figure 5. Process Flow Comparison

In new process flow (refer to figure 5), it can be seen here that the releasing of PRCO document will be quicker compared to the current process because the implementation of the action item can be done once the ECN is uploaded to the ECC system unlike the current process that you can only release the document once the initial action items have been completed

1.3.1.1 PRCO / ECN Distribution process

In the current process of ECN Distribution, the Engineering clerk will give a copy of the ECN to each concerned section as their reference in implementing the PRCO.

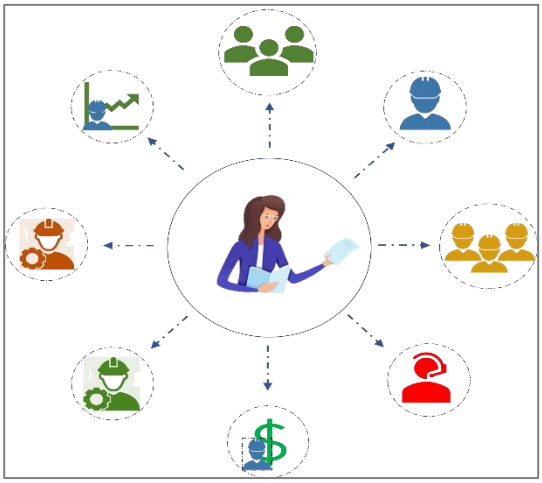


Figure 6: Current distribution process

In this new PRCO process, the generated ECN will be uploaded to the ECC system and it will be accessed by the concerned sections to see the full details of the PRCO.

Figure 7: New Distribution Process

1.3.2 PIMES System

The P. IMES system is a companywide system used by PIMES employees. It acts as a centralized hub for all paperwork that flows in and out in each business unit.

1.3.3 ECC System Menus

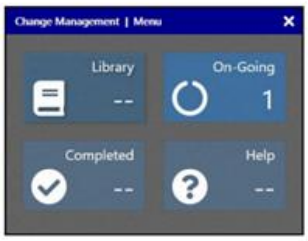
The ECC system is separated into three users, each user has their own capabilities and limitation. The first is the **Encoder**, who starts the PRCO Process by constructing a PRCO form and submitting it for the processors to review and process the action items. The second user is the **Processor**, which is utilized by other sections to validate the generated PRCO form and process their action item(s). The third type of user is the **Viewer**, who can just view and monitor the ECN that has been formed. They are not permitted to implement the PRCO.

ECC System Menus

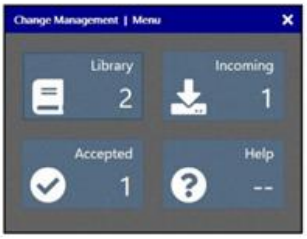
Each user has a different menu in the ECC system.

Roles	On-Going	Incoming	Library
Encoder	☒	☐	☒
Processor	☐	☒	☒
Viewer	☐	☐	☒

ENCODER MENU



PROCESSOR MENU



VIEWER MENU

1.3.3.1 On-Going Menu

Where the Encoder user can create, upload and cancel a PRCO form. It also has a follow up button which will automatically send a follow up email to the Processor with a pending action item.

1.3.3.2 Incoming Menu

In this menu the Processor will receive all the ongoing PRCOs that they need to process. They can also return the PRCO form for revision in case there where discrepancies found.

1.3.3.3 Library Menu

All users can see here all the ongoing, completed and canceled PRCO forms.

1.3.4 ECC System Key Features

This ECC system is not just a digital library, it also has many features such as automated email notification, follow up notification, simplified content modification and many others.

Automated ECN Issuance

Automated Email Notification

Digital Library

Simplified Content Modification

Accessible Files Monitoring & Real Time Viewing

Faster CM Process Turn-Around-Time

Zero to Low Material Consumption

2.0 METHODOLOGY

In implementing the digitization process, we have considered things such as what is our goal in implementing this system, what process should we prioritize and what technology or equipment will we use to make the project successful.

2.1. Goal

To achieve the digitization process, we must not only understand how the paper-based process will change to a digital process, but also take into account how it will contribute to reduced indirect material usage, quick turnaround times, and ECN status monitoring.

Figure 8 shows that the printing process of ECN which causes high indirect material cost consumption is eliminated and it is already uploaded in database and this ECN can be easily accessed and monitor.

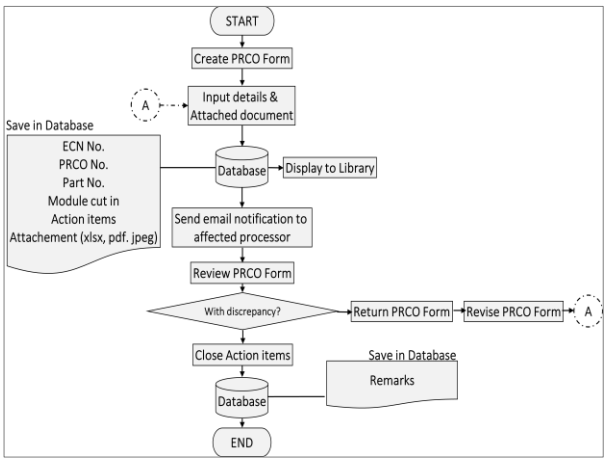


Figure 8: Digital process flow

2.2. Target Identification

In this process, we identified here which of the change management process should be prioritized to be implemented in the digitization process and based on previous data, we determined that the PRCO process should be prioritized due to the complexity of its process, high TAT and indirect material cost.

In this figure, it shows that the PRCO process has the highest indirect material cost consumption compared to other branches of change management.

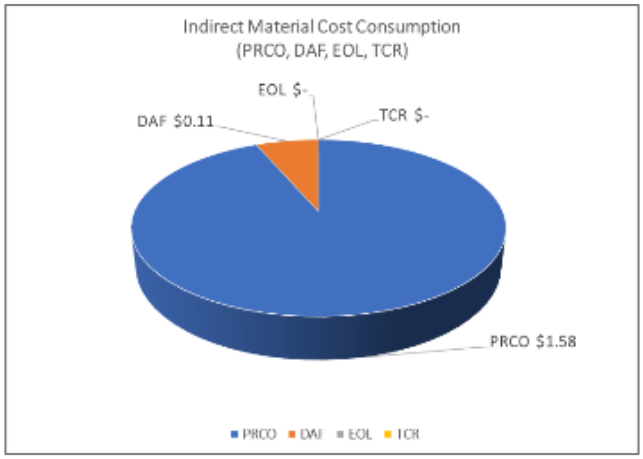


Figure 9: Indirect Material Cost Consumption of PRCO, Derogation, EOL & TCR Process

In this figure, it shows that the PRCO process has the turnaround time compared to others due to the number of action items that need to be done before PRCO can be implemented in a product or process.

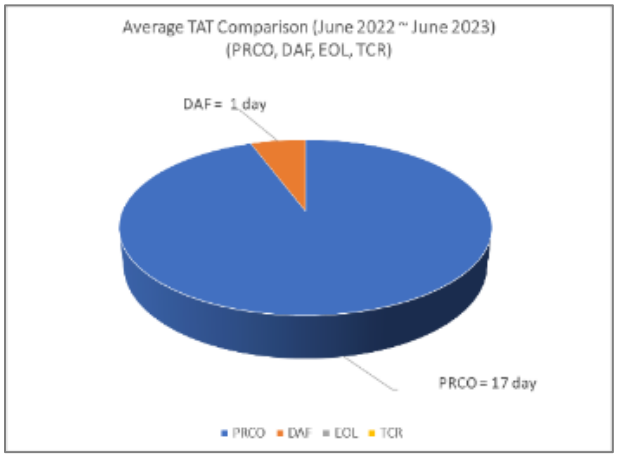


Figure 10: TAT Comparison of PRCO, Derogation, EOL & TCR Process

2.3. Choosing the right technology to support the digitization process

Choosing the right technology to be used in digitization is one of the important things for its successful implementation. In this system, we considered below software as the most compatible since C# is a user friendly and easy to read Programming Language and MySQL being the best Database program for running in a production environment.

Software

Operating System	Windows 10
Integrated Development Environment	Visual Studio Community 2022
Programming Language/s	C#, SQL
Database	MySQL
Application Software	ECC System (Integrated to P. IMES System)

Hardware

Processor	Intel Core i5-1035G1 1.2GHz
RAM	20gb 2666mhz
Storage	1TB HDD

2.4 ECC system and other related software

The ECC system is linked to other PIMES software, such as SAP and Outlook email to improve the flow of the ECC system.

2.4.1 System Application & Product (SAP)

SAP is a software that creates a centralized system for businesses that enables every department to access and share the details of each part and/or product such as parts description, parts inventory & parts status.

Since the ECC system is already connected to SAP, it can eliminate the wrong encoding of the affected part numbers because its details will automatically reflect in the ECC system during ECN Form Generation.

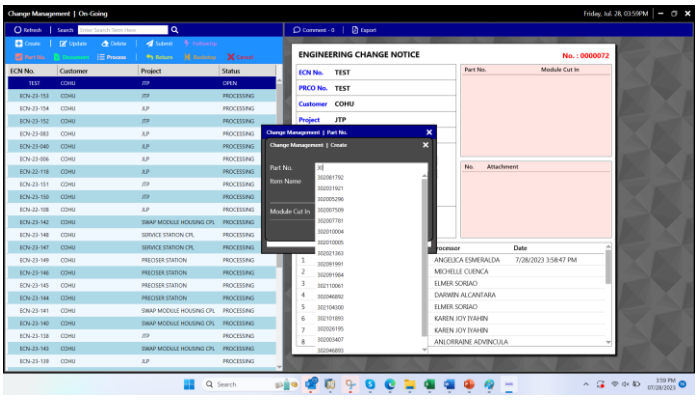


Figure 11: Sample of ECN Form Generation

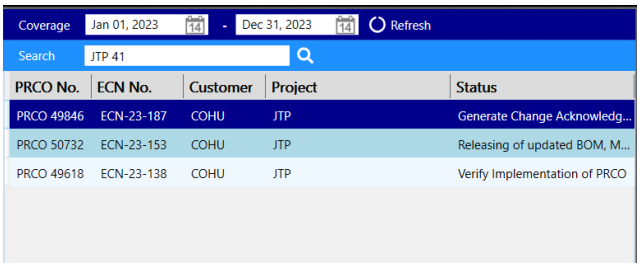
2.4.2 Outlook Email

The ECC system is connected to the outlook email used by the PIMES system. Once an ECN is uploaded to the ECC system, the ECC system will automatically send an email to people who have an action item on that particular ECN. It also has a follow button that when pressed by the ECN Originator will send an email again to the in-charges who still have pending action.

3.0 RESULT & DISCUSSION

The use of the ECC system has helped a lot to improve the TAT of implementing PRCO because this system has a search bar, email notification and incoming menu where it will be easier to find the PRCO that needs to be implemented in a module or machine.

3.1 Search Bar



Here in the search bar, you can easily find all PRCOs that need to be implemented. You just search the module number and it will shows all the PRCOs with this module number effectivity.

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3.1 TAT Result using ECC system

Figure 12 shows that our TAT reduced by 88.23% from an average of 17 days to 2 days upon implementation of ECC system. It simply shows that those in charge can more easily implement their action items when the document is viewable and accessible anytime.

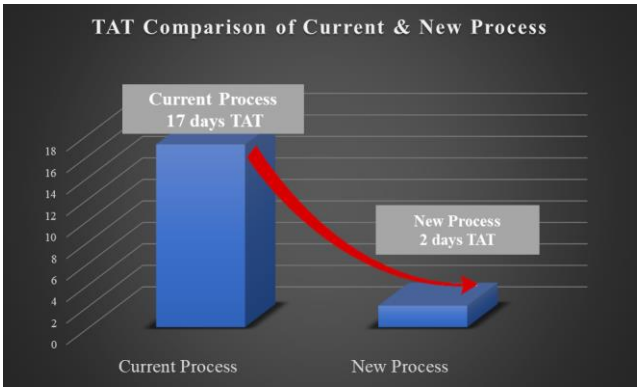

Figure 12: TAT result of total posted ECN

3.2 Indirect Material Cost Saving

PRCO currently has a cost saving from July 1 to July 27 2023 of $29.51 based on the 18 ECN generated using the ECC system. This savings can be increased by $167.50 based on the projected plan of 60 PRCOs until November.

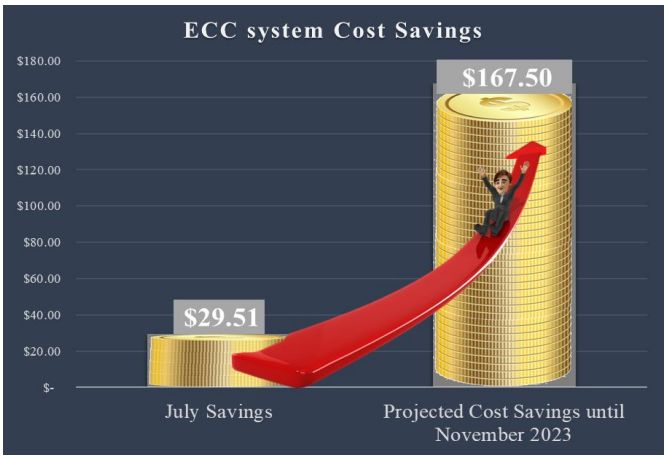

Figure 13: Cost Saving result

4.0 CONCLUSION

This ECC system that transformed the paper-based process into a digital one greatly contributed to the reduction of indirect material costs from $1.58 per PRCO to zero use. Additionally, it decreased the turnaround time (TAT) for executing PRCO/ECN action items from an average of 17 days to 2 days. These results simply shows that it is highly beneficial for PRCO process optimization.

5.0 RECOMMENDATION

This ECC system is highly recommended to be implemented also in Derogation and TCR that require strict monitoring and implementation to further improve the internal process.

6.0 ACKNOWLEDGMENT

I would like to show my gratitude and appreciation to Mr. Jermie De Mesa who guided and worked with me to conceptualize the ECC system. To the entire ATS for their full support of this project. To all personnel who cooperated in the implementation of this new system. To Mr. Irvin and IT Team who made the ECC system program to make this project successful.

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8.0 ABOUT THE AUTHOR

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