

15th Chemical Process Safety Sharing (CPSS)

New Era of Safety Operation by Digital PSSR

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Senior Process Safety Engineer - Process Safety Risk SCG Chemicals Ltd. , Thailand

Experience: 8 Y in Process Safety Management and 6 Y in Oil and Gas operation

Areas of Specialization

- Process Safety Management (PSI, PHA, MOC, PSSR, Audit)
- Hazard Identification and Risk Assessment (HAZOP Study)

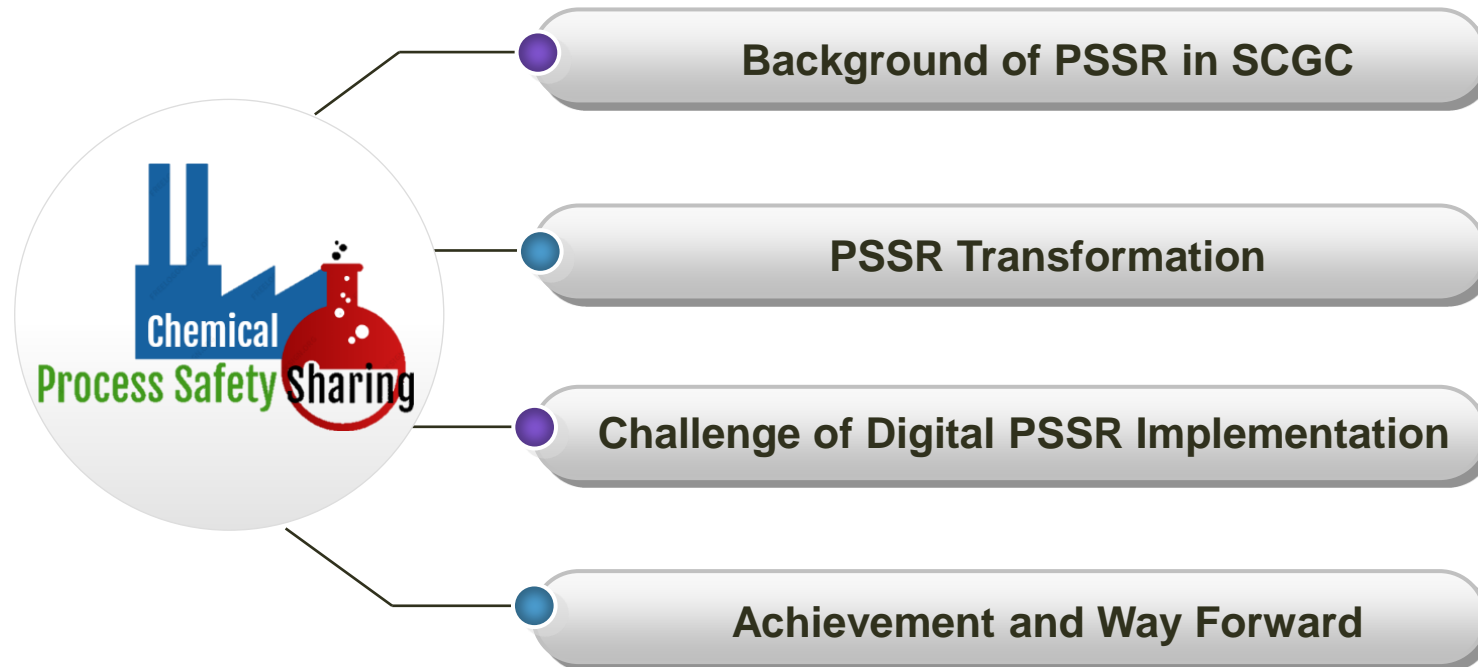
Project Achievement:

- MOC Digital Platform Package
- PSM Dashboard and KPI Tracking
- Corporate Safety Management Digital KM

Certification

- Thailand's PSM External Auditor Registered (I-0168)
- Certified Lean Six Sigma – Green Belt

Contents



Background of PSSR in SCGC

• Example of PSSR related Accident Case

Bayer Crop Science, LP (West Virginia) - August 28, 2008

Pesticide Chemical Runaway Reaction
Pressure Vessel Explosion

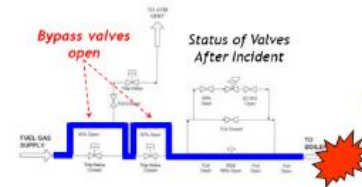
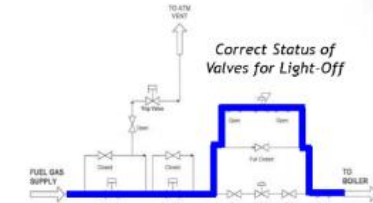
(Two Killed , Eight Injured)



Failure to apply PSSR

- Incorrectly identified i.e. SOP inadequacy
- Equipment installation was not verified
- Punch from PSSR was not follow up.

Singapore Chemical Plant (2000) Boiler Explosion



- 3 operators were badly burned - 2 fatally

Failure to apply PSSR

- Missing on Car seal position confirmation
- Technicians not qualified
- PSSR documentation missing

Williams Olefins (Geismar, LA) - June 13, 2013

Plant Explosion and Fire (2013)

(Two fatally injured)



Failure to apply PSSR

- Not perform adequate PSSRs for two significant process changes involving the propylene fractionator reboilers

15th Chemical Process Safety Sharing (CPSS)

May 20th-22nd, 2025, Dusit Thani Pattaya Hotel, Chonburi



Background of PSSR in SCGC

2018 – 2020 [3Y]

System Implementation

- STD Process
(10 Companies in SCGC)
- Tracking & Monitoring

Pre Start-Up Safety Review Final Audit Report					
Project/Job name :		Date :			
Section :		Department :		PSSR No. :	
PSSR team members :					
	Name	Department	Title	Signed	Date
Leader					
Member 01					
Member 02					
Member 03					
Pre Start-Up Safety Review team summary report :					
PSSR Phase	Punch "A" *	Punch "B"	No check	Remark	
Construction check.					
Installation completion check.					
Pre energization check.					
Pre commissioning check.					
Pre Start-up Safety Review check.					
* Punch : "A" mean it's critical and need to be completed before start up.					
PSSR Team summary report to Facility owner :					
PSSR Team	Name	Title	Signed	Date	
PSSR Team Leader					
Facility owner acknowledge summary report :					
Facility owner	Name	Title	Signed	Date	
PSSR Team verify all Punch "A" are completed :					
PSSR Team	Name	Title	Signed	Date	
PSSR Team Leader					
Approval To Start Up Facility :					
Authorizer (Facility owner)	Name	Title	Signed	Date	
Approve by representative person					
<input type="checkbox"/> Line app. <input type="checkbox"/> Email <input type="checkbox"/> SMS Authorizer (Facility owner) must approve within 30 days					
Pre Start-up Safety Review report for closing.					
PSSR Phase	Punch "A" *	Punch "B"	No check	Remark	
Construction check.					
Installation completion check.					
Pre energization check.					
Pre commissioning check.					
Pre Start-up Safety Review check.					
Review completion :					
Leader :		Title :		Date :	
Approval to close :					
Facility Owner :		Title :		Date :	

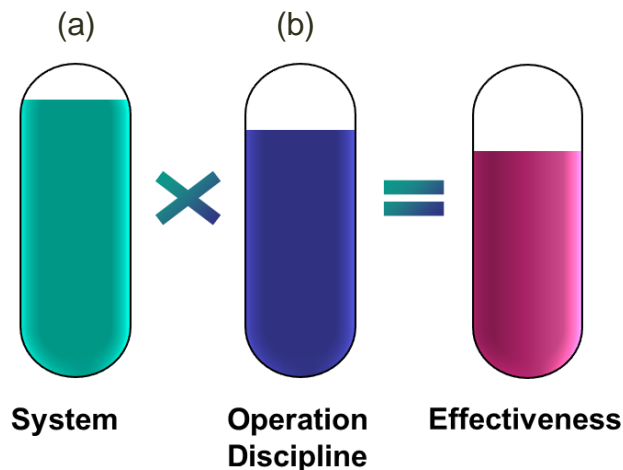
System Sustainment

- PSSR Quality to check and confirm all aspect before start-up

Past Performance Analysis :

PSSR-related Incident still **occurs** by:

- Ineffective PSSR checkpoint - **System**
- Ineffective PSSR Reviewing - **Human**



Result in:

- > Assess Damage
- > Business Downtime= 3.5 Days

Pain/Voice of Customer from PSSR system :

- Insufficient review aspect for start-up
- Complexity in PSSR Checklist
- Evidence collection
- Inappropriate PSSR record database/tracking system
- Time consuming PSSR process

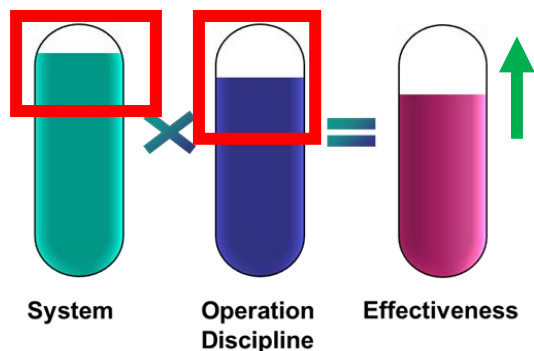


PSSR Journey

2021 - 2022

System Sustainment

- PSSR Process Optimization
- Empathy with stakeholder
- Compare with international



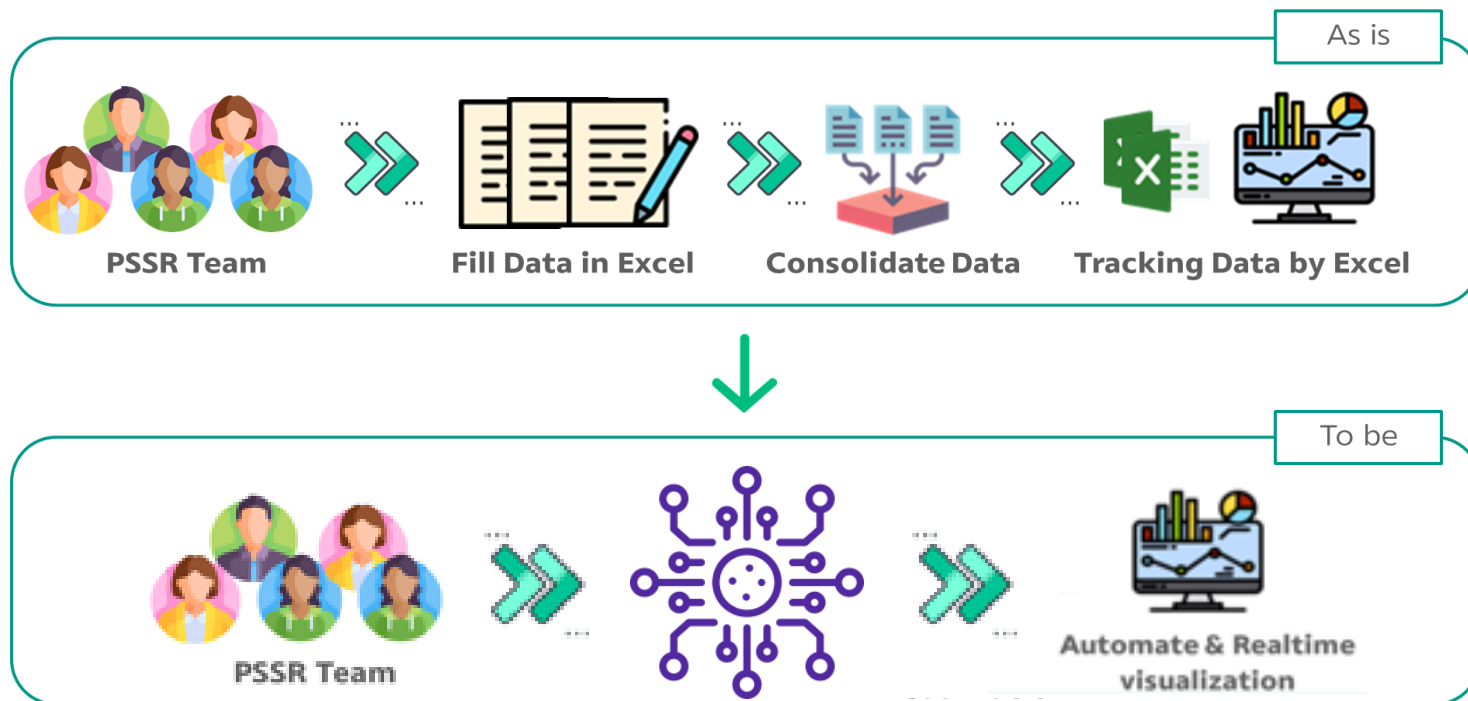
2023 - 2025



Digital Process to serve PSSR users

- Workflow
- Platform
- Database
- Visualization & Tracking

Conceptual Design:



Digital PSSR: Transformation

Digital PSSR

Legacy Practice

Pre Start-Up Safety Review Final Audit Report

Project/Job name : PH-345A Date : 21/12/65
 Section : ARU Department : ARU PSSR No. : PSSR-MSC-ARU-2012-01

PSSR team members :

No.	Name	Department	Title	Signed	Date
Leader	Sauwong K.	ARU	Chief safety system	[Signature]	21/12/65
Member 01	Singha T.	ARU	Chief safety system	[Signature]	21/12/65
Member 02	Singha T.	ARU	Chief safety system	[Signature]	21/12/65
Member 03					
Member 04					
Member 05					
Member 06					
Member 07					
Member 08					
Member 09					
Member 10					
Member 11					

Pre Start-up Safety Review team summary report

PSSR Phase	Punch "A"	Punch "B"	No check	Remark
Construction check				
Installation completion check				
Pre energization check				
Pre commissioning check				
Pre Start-up Safety Review check	3	4		

*Punch : "A" error it is critical and need to be completed before start up

PSSR Team summary report to Facility owner :

No.	Name	Title	Signed	Date
PSSR Team Leader	Sauwong K.	Chief safety system	[Signature]	21/12/65

Facility owner acknowledge summary report :

No.	Name	Title	Signed	Date
Facility owner	Singha T.	ARU Dept. Manager	[Signature]	21/12/65

PSSR Team verify all Punch "A" are completed :

No.	Name	Title	Signed	Date
PSSR Team Leader	Sauwong K.	Chief safety system	[Signature]	21/12/65

Approval To Start Up Facility :

No.	Name	Title	Signed	Date
Authorizer (Facility owner)	Singha T.	ARU Dept. Manager	[Signature]	21/12/65

Approved by representative person

☐ Live app ☐ Email ☐ SMS Authorizer (Facility owner) must approve within 30 days

Pre Start-up Safety Review report for closing

PSSR Phase	Punch "A"	Punch "B"	No check	Remark
Construction check				
Installation completion check				
Pre energization check				
Pre commissioning check				
Pre Start-up Safety Review check				

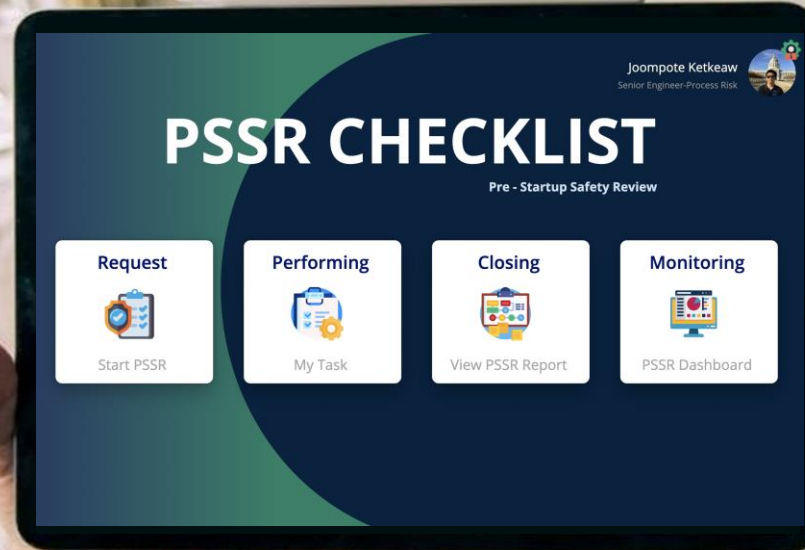
Prepared and Review completion :

Facility Owner (Section Manager) : [Signature] Title : ARU Dept. Manager Date : 21/12/65

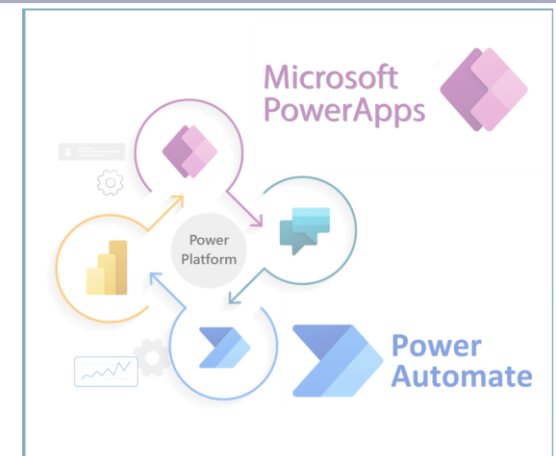
Approval to close :

Facility Owner (Department Manager) : Singha T. Title : ARU Dept. Manager Date : 21/12/65

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Existing Digital Platform using in SCGC





PPA & VOC

(a) Insufficient review aspect for start-up

(b) Complexity in PSSR Checklist

(c) Evidence collection/Tracking

(d) Time consuming PSSR process

Key Feature

Information

Company :

Map Ta Phut Olefins Co.,Ltd.

Plant :

COLD

Area :

2000

Other

Project Name :

T/A Shutdown Project

PSSR Evaluation :

Perform PSSR

Not Perform PSSR

PSSR Reason :

After Shutdown

PSSR Assessment Date :

11-Oct-2023

Ref. PSSR No :

PSSR Phase :

Installation Completion

Pre-Energization

Pre-Commissioning

Final PSSR

MOC Related :

PSSR Leader :

Aroonpong Chaimongkolcharoen

Facility Owner :

Kunlapat Tannapaiboon

Customized Checklist
From Centralized Databank



PPA & VOC

(a) Insufficient review aspect for start-up

(b) Complexity in PSSR Checklist

(c) Evidence collection/Tracking

(d) Time consuming PSSR process

Assign Team Member

Search Member

Name	Title	Company	Dicsipline
member Jirapa Huangyot	Smart MOC (Management of Chage)	0090-SCG Chemicals Public Con	<div> <div>MT-EE</div> <div>MT-ME</div> <div>MT-PdM</div> <div>MT-IE</div> <div>Operation</div> <div>SHE</div> <div>Eng</div> <div>Civil</div> </div>

Perform

Jirapa Huangyot

Smart MOC (Management of Chage)

Save Draft

Submit

PSSR No : PSSR-MOC-SC-2023-0004

Search

Field Verify

Phase

Status

Item No.	Checklist Item	Category	Field Verify	Phase Name	Status
PC23	Have the relief valve calculations been documented ? (มีเอกสารการคำนวณอุปกรณ์ระบายความดันหรือไม่)	Operation	No	Pre-Commissioning	Start
		Perform Date	Result		
		26-Oct-2023	✓		
PC24	Has the relief valve been tested and set in the shop ? (การทดสอบการทำงานของ Valve ระบายความดันและตั้งค่าตามจากโรงงานหรือไม่)	Operation	No	Pre-Commissioning	Start
		Perform Date	Result		
		26-Oct-2023	✓		
PC25	Does the relief valve vent to an acceptable location ? (อุปกรณ์ระบายความดันได้ระบายออกสู่พื้นที่ปลอดภัยหรือไม่)	Operation	Yes	Pre-Commissioning	Start
		Perform Date	Result		
		26-Oct-2023	✓		

Key Feature

PSSR checklist delegation to members



More focus on PSSR assessment



PPA & VOC

(a) Insufficient review aspect for start-up

(b) Complexity in PSSR Checklist

(c) Evidence collection/ Tracking

(d) Time consuming PSSR process

Perform Checklist Item

Perform by : Joompote K

A ☒ >>

Perform by : Joompote K

B ☒ >>

Attachments

* MaxAttachmentSize 10 MB

20230221_131913.jpg

Attach file

Key Feature

Real-time evidence collection
(Photo, Voice to text, Documents, etc.)

Request	Perform	Punch list	Acknowledge	Modify / Verify	Start up	Closed
1	2	3	4	5	6	7
Summary Punch list						
Item No.	Punch	Due Date	Action	Responsible Person	Verify Person	
FC116	A	20-Oct-2023	Punch A by Nut	Joompote Ketkeaw	Pannipa Kamsuwan	
IC08	A	19-Oct-2023	ติดตั้ง	Wisit Waeuseng	Jirapong Weerasak	
FC34	A	19-Oct-2023	Punch A #jrp	Kunlapat Tannapaiboon	Joompote Ketkeaw	

Automatic Checklist and Action Consolidation

1

Request

2

Perform

3

Punch list

4

Acknowledge

5

Modify / Verify

6

Start up

7

Closed

Modify Punch list

Total Punch A : 6

Total Punch B : 6

Responsible Person	Punch A Pending	Punch A Pending verify	Punch B Pending	Punch B Pending verify
Jirapa Huangyot	6	0	6	0

Summary Punch list

Item No.	Punch	Due Date	Action	Before	After	Status	Waiting for
IC04	A	20-Oct-2023	Punch A addd			Start	Jirapa Huangyot

Real-Time Tracking



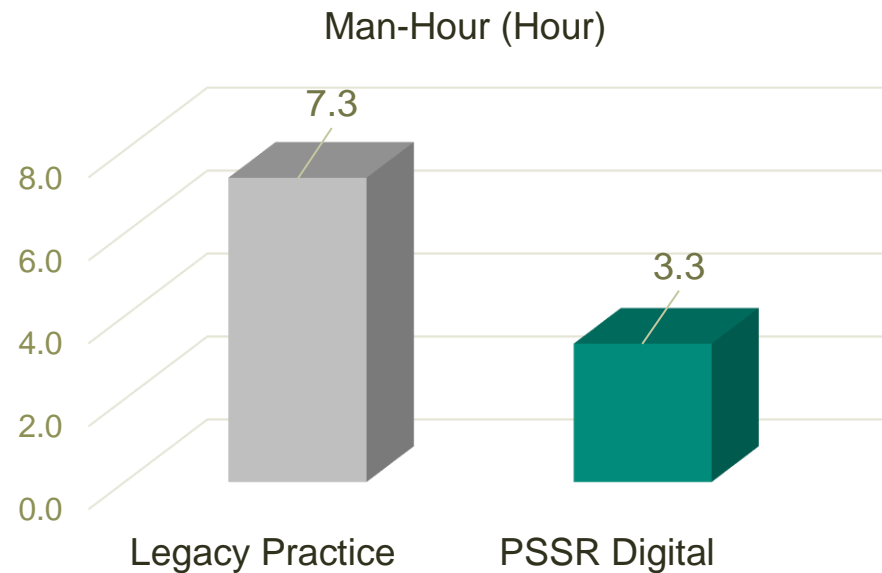
PPA & VOC

(a) Insufficient review aspect for start-up

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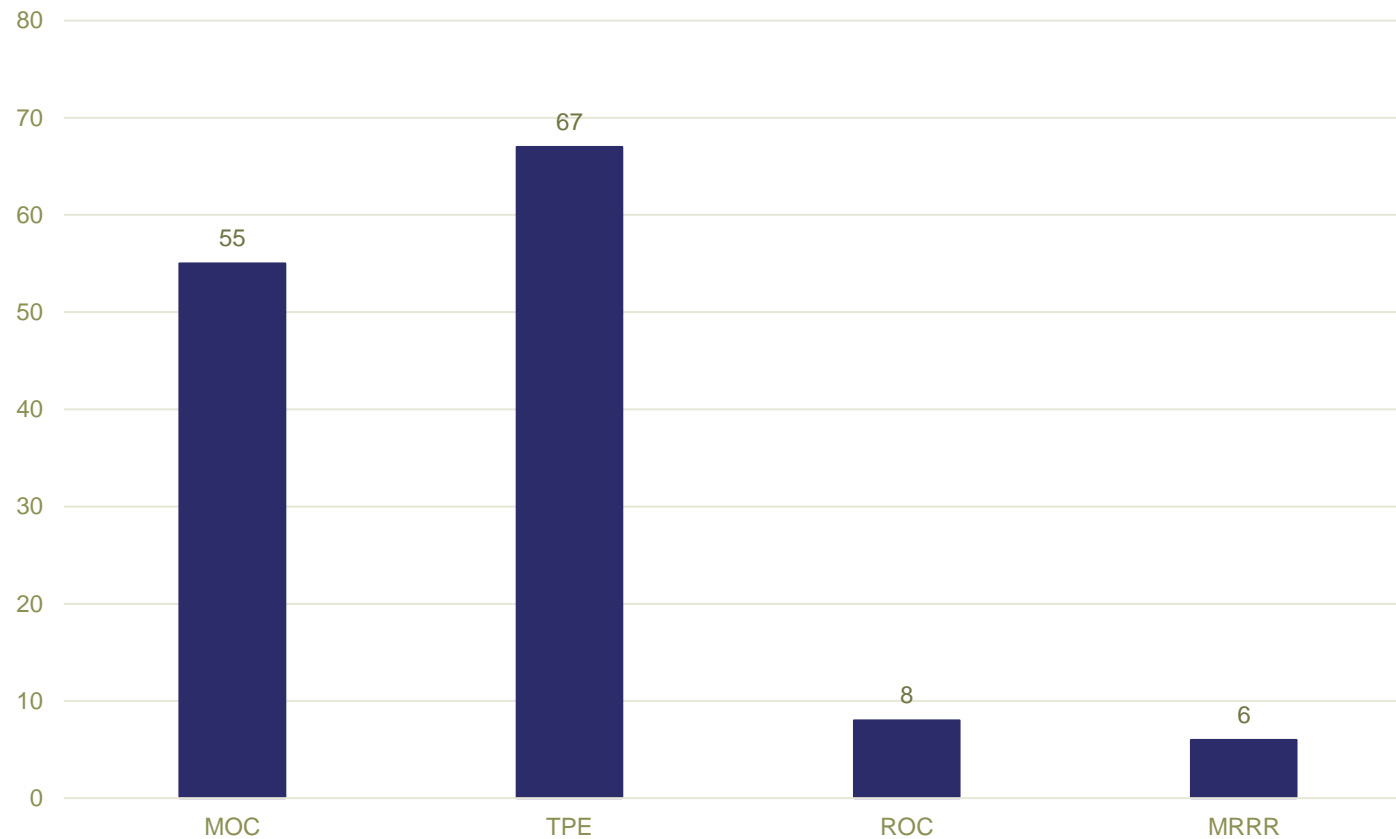


0.5 Man-Day Saving / PSSR

Digital PSSR – Used Cases



No. (YTD)

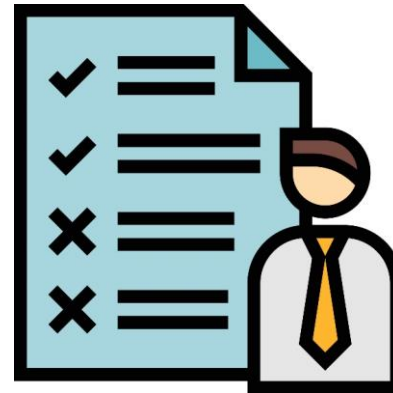


Challenge of digital PSSR Checklist Implementation

Chapter 1: Requirement Development & Application Design

- PSSR Past Performance Analysis and VOC from Plants

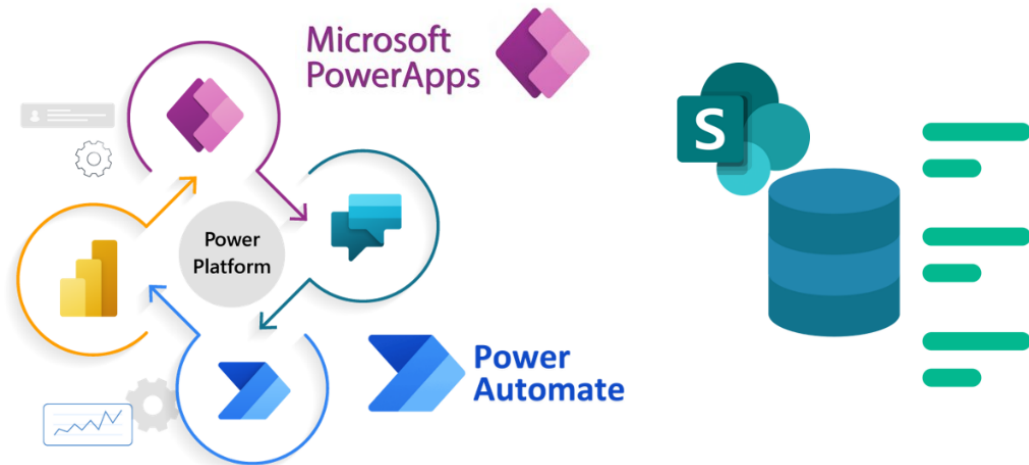
“Complete” - “Clear” – “Confirm”



Challenge of digital PSSR Checklist Implementation

Chapter 2: Application Design

- Interpreted the result of PPA and VOC to Application requirements
- Review Existing Practice and develop PSSR workflow process
- Select suitable tools to develop Digital PSSR



Challenge of digital PSSR Checklist Implementation

Chapter 3: Application Testing & Piloting

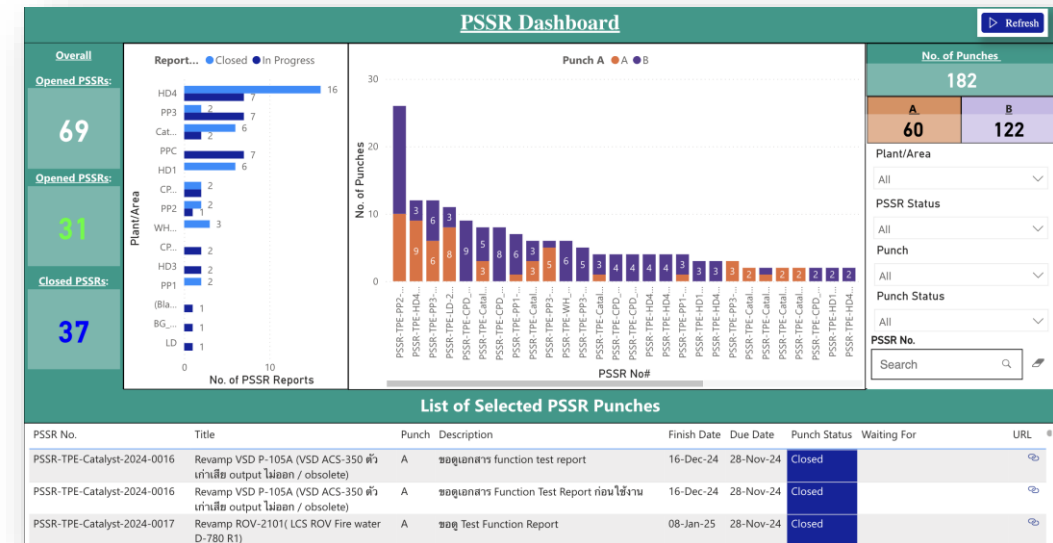
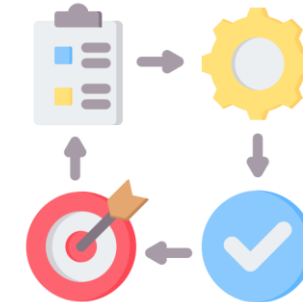
- Collaborate with plant's users
- Convince plants personnel to buy-in on benefit of Digital PSSR application



Challenge of digital PSSR Checklist Implementation

Chapter 4: Sustainment

- Plant's data correction
- Plant's configurations & visualization





Fully Risk Coverage



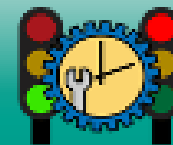
On PSSR Assessment Checkpoint



↓25%

Human Action

(Potential to Human Error)



up to

55%

Efficiency Gain from NPT reduction



**Real-Time
Tracking/Monitoring**



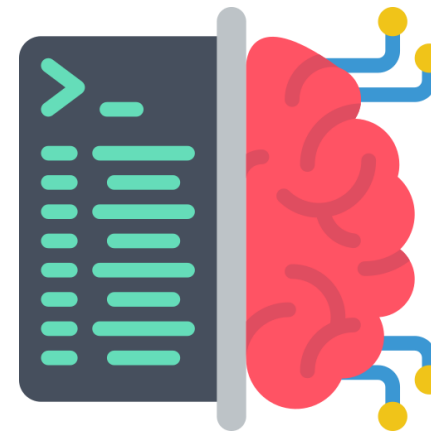
Fully Auditable
Single-source Database



Multi-Device Platform

Way Forward

- Web application for Sustainment and Scale-Up
- Apply Data Analytic, AI Assistant and Machine Learning in PSSR's Big Data for better PSSR's effectiveness



Key Takeaway



Digital application is not only a final solution to create Incident Free Operations, but also users who have a well-understanding of the PSM process with good operation discipline as well



Thank you for your attention

