

UTAMAKAN KESELAMATAN

TOYOTA
INDONESIA
PT Toyota Motor Manufacturing Indonesia

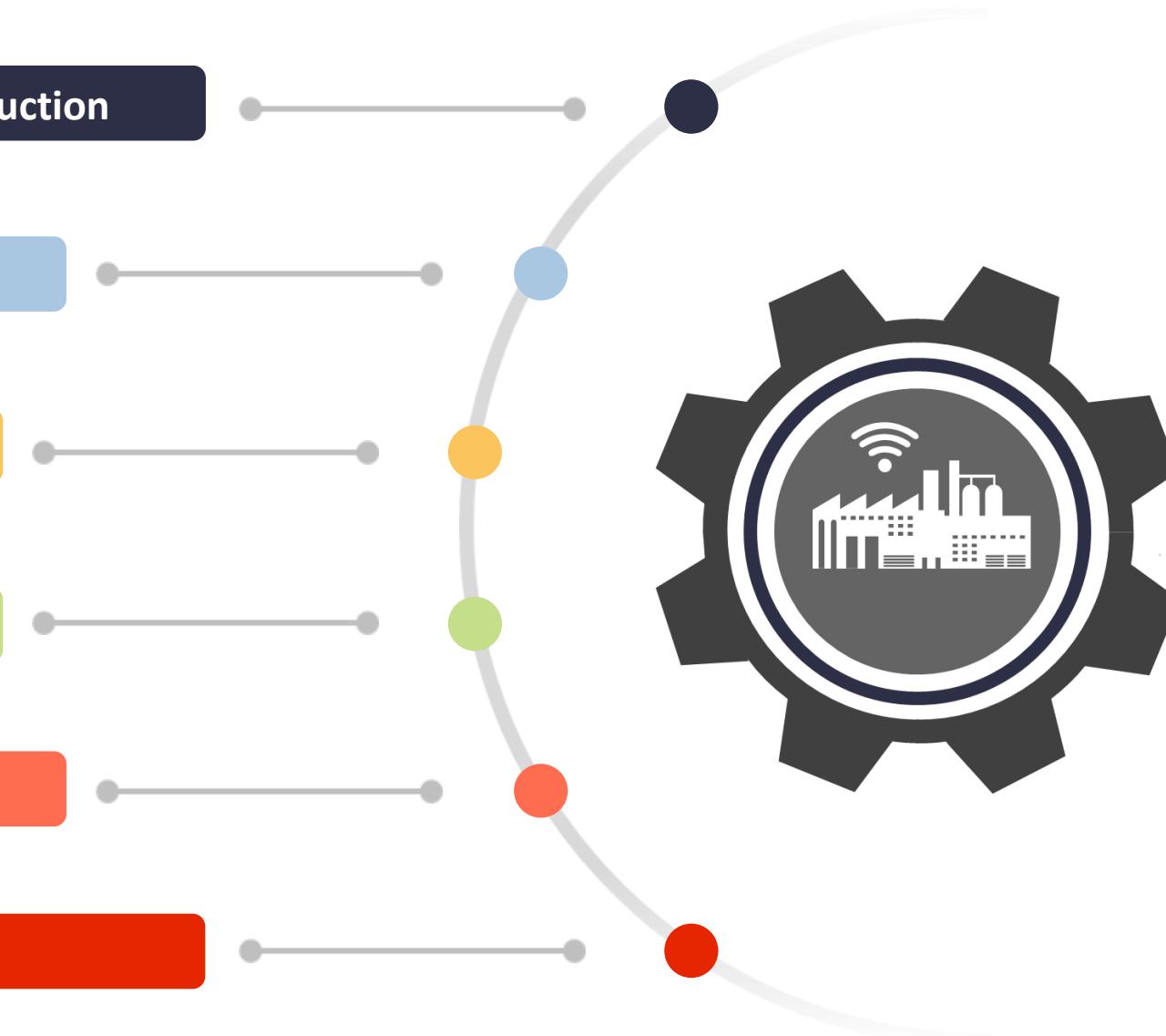
SPEEDY

PED

ASSEMBLY #1 PLANT IMPROVEMENT

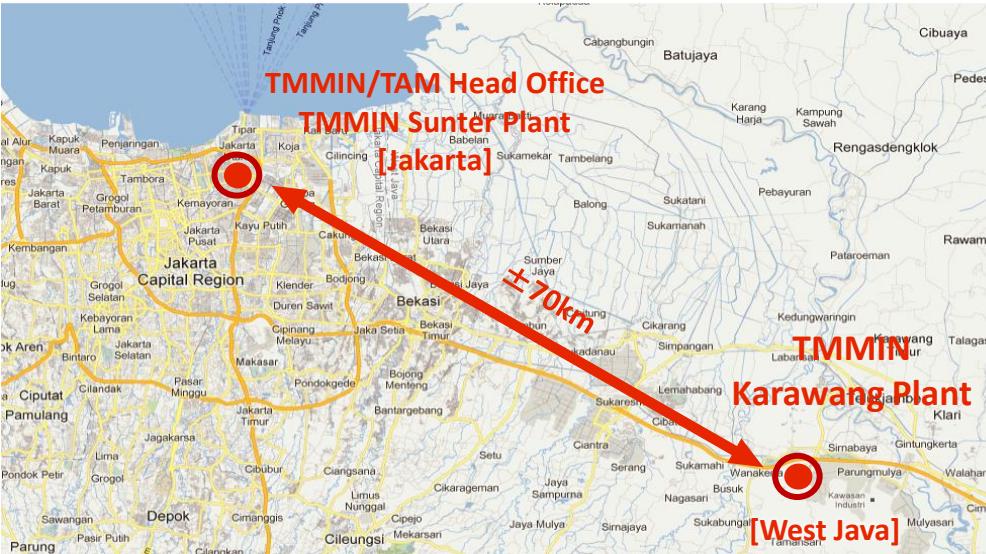
To be The Most **FLEXIBLE** & Competitive Assembly Plant in Asia

SPEEDY ACTION, SPEEDY EXECUTION

I. Workplace Introduction**II.** Background**III.** Strategy, Target, and Schedule**IV.** Improvement**V.** Evaluation/Result**VI.** Next Action

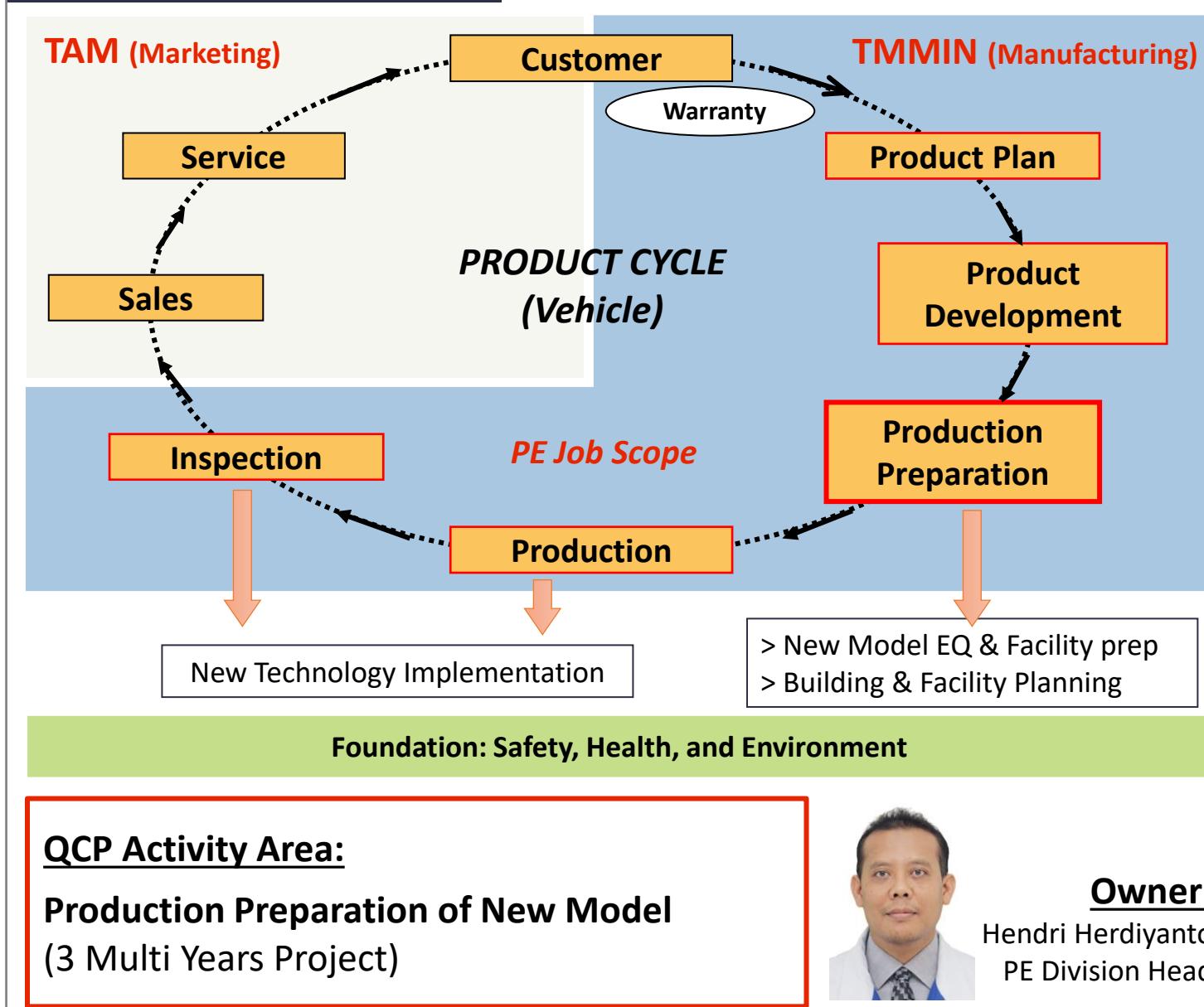
PT TMMIN

PT TMMIN have 2 main Locations & 5 Production Plants.



Plant	SOP	Production	
Sunter 1	1973	Unit	(1) TR Engine (2) Engine/CKD Parts (CEVD)
Sunter 2	1977		(1) Press Part (3) Press mold, Jig (2) Casting Part
Karawang 1	1998	Vehicle	(1) Innova (3) Zenix (2) Fortuner
Karawang 2	2013		(1) Calya (3) Yaris Cross (2) Yaris (4) Veloz
Karawang 3	2016	Unit	R-NR Engine

PE WORKPLACE OUTLINE



MANAGEMENT DIRECTION FY 22/23

**Mr. Warih A. T. (TMMIN President Director)**

Focus on our fundamental especially in safety and quality.

Think with '**YOU VIEW**' approach, sharpen our **antenna**, strengthen cross function **collaboration**, and **enjoy the process**.

**Mr. I Nyoman Winaya (TMMIN Manufacturing Director)**

1. Smooth Execution of 3 model multiyear project include HEV model in 2022 & achieve competitiveness level.
2. Structural Reform Step #2 Expansion with new approach

**Mr. Hendri H. (PE Division Head)**

This FY is important for us. We will **face the final preparation for C-MPV & B-SUV in parallel improve goguchi towards manufacturing competitiveness.**



To success this activity, we need to make clear **plan**, **speedy execution**, and collaborate all resources as **one team**.

PE HOSHIN

Focus 3 multi-years project smooth preparation & SR#2 expansion Activity (Goguchi Improvement)

Directorate:



Structural Reform #2 Expansion

- | | | |
|---|---------|------------------|
| ① Foundation & TD Monozukuri | Beyond: | ② Quality |
| | | ③ Cost |

- | | |
|----------|----------------------------|
| ④ | ◆ Attain Future Model B, C |
| | ◆ Supply Chain Development |
| | ◆ Recovery Business (new) |

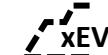
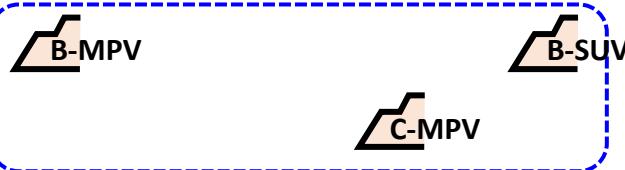
- | | |
|----------|------------------------------|
| ⑤ | ◆ Future Manufacturing |
| | ◆ Tooling Expansion |
| | ◆ Environment Challenge 2035 |

Division:

1. Smooth preparation 3 multi-years project



2. SR & TD Monozukuri



[SR-1] Catch-up

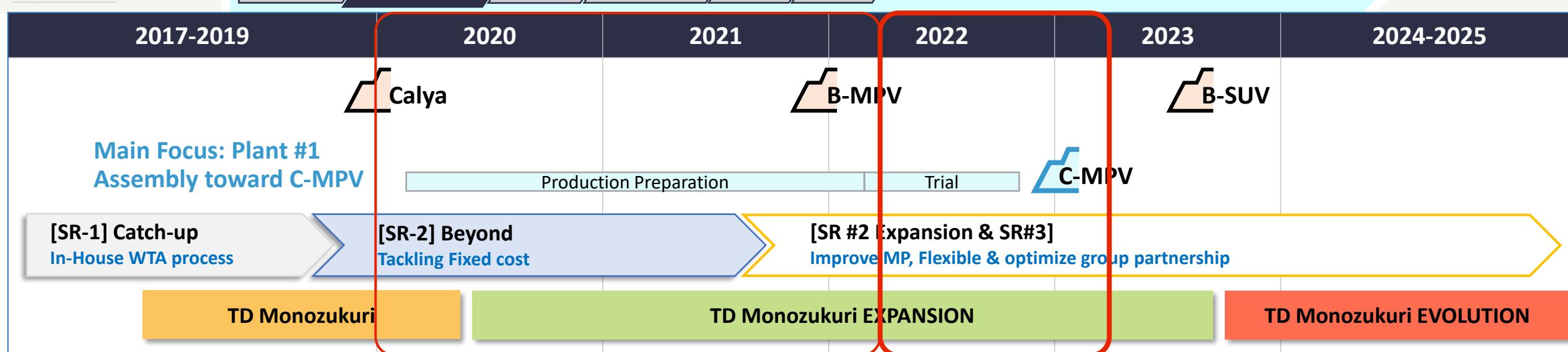
[SR-2] Beyond

SR #2 Expansion & SR#3

TD Monozukuri

TD Monozukuri - Expansion

TD Monozukuri - Ultimate



Assembly #1 Improvement Activity (2020-2021)

> Mission : Become the most FLEXIBLE & Competitive Assembly Plant toward C-MPV SOP

> Kadai : **Space availability**

> Strategy : ① New Engine Line: Common Docking

② Open East Building for Logistic

③ Improve Headlining supply
[Jundate → Junbiki]

④ Bumper Transfer
[Towing → Auto transfer]

⑤ Compact & Centralize Oasis



PDCA

FY 22-23 Plan

> Mission : Become the most FLEXIBLE & Competitive Assembly Plant toward C-MPV SOP

> Kadai : **Crossing point & Long distance supply**

> Target :

**Assembly #1 Improvement
SAFETY & PRODUCTIVITY
to Achieve Ideal Layout**

TASK TEAM MEMBER

PE Division Head



PE Shop Manager



Gatot W. Aji S.

Hendri H.

Facilitator (SH)



Budy K. Christian

Activity Leader



Sathya PPE Edi Ivan APE

PED - Assembly



PED - Toso



PED - Building



PED - Safety



PED - Plan



APPD – Assy Eng, Prod, Maint



PAD – Logistic & PPIC



PuD – NCB



15 Supporting Contractor



TASK TEAM ACTIVITY

PLAN

1. Grasp Situation & Analysis
2. Concept & Setting Target
3. Improvement Plan



DO

1. Equipment Spec
2. Relayout & Installation



CHECK

1. Follow up result
2. Activity Evaluation



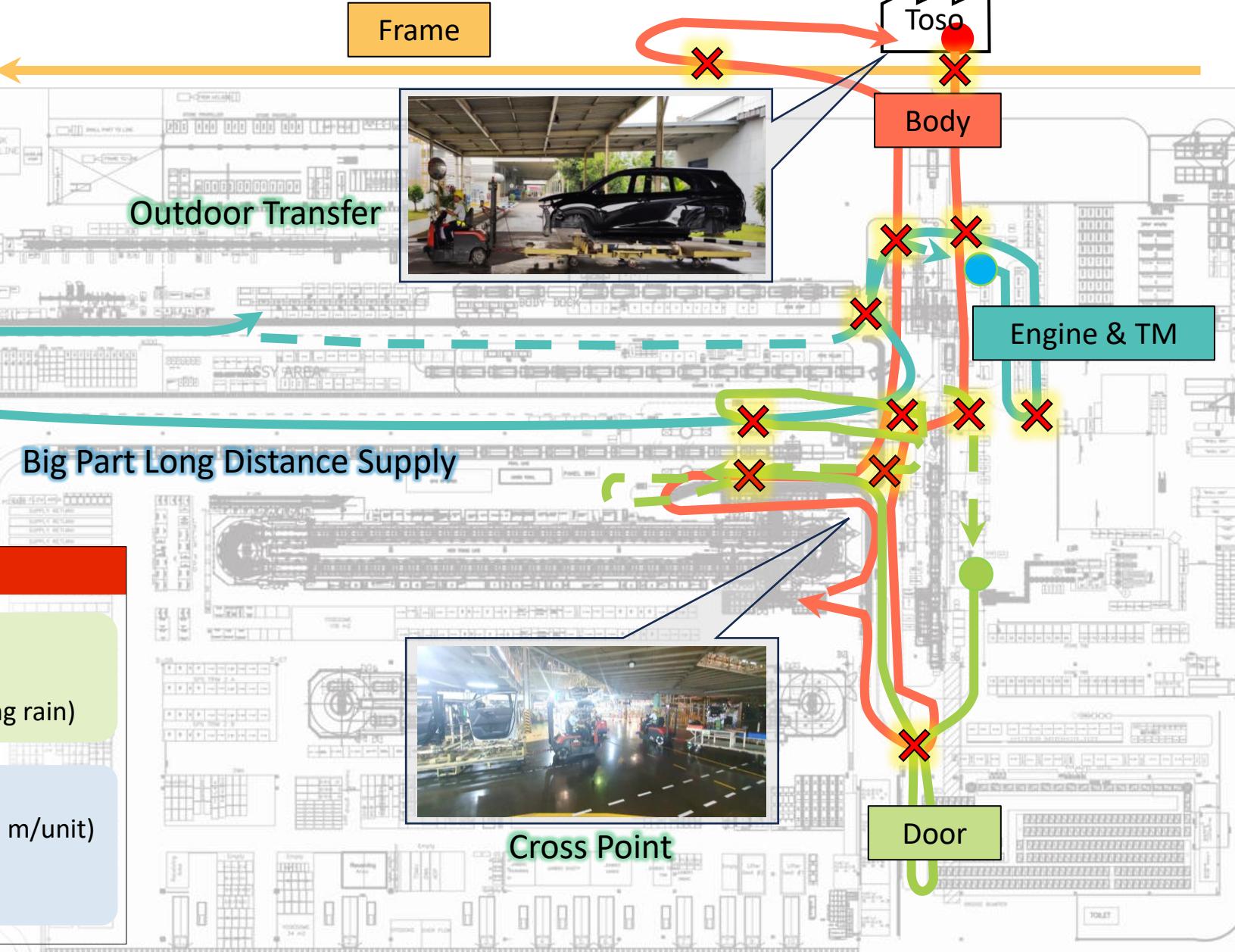
ACTION

1. Standardization
2. Yokoten & Kaizen

ASSEMBLY BIG PART ROUTE



Engine Drop



KADAI



- 12 cross point
- Engine **drop** (350 kg)
- Outdoor transfer (**wet and dirty** during rain)



- Long distance supply (**late process**):
- Engine and transmission supply (415 m/unit)
 - Door supply (327 m/unit)
 - Body supply (423 m/unit)

CONCEPT & KOWADARI

IDEAL LAYOUT



**SSC, Kinsetsuka,
and Direct Supply**



**Safe and Flexible
Equipment**



**Automation
(DX Introduction)**

TARGET & ACTIVITY

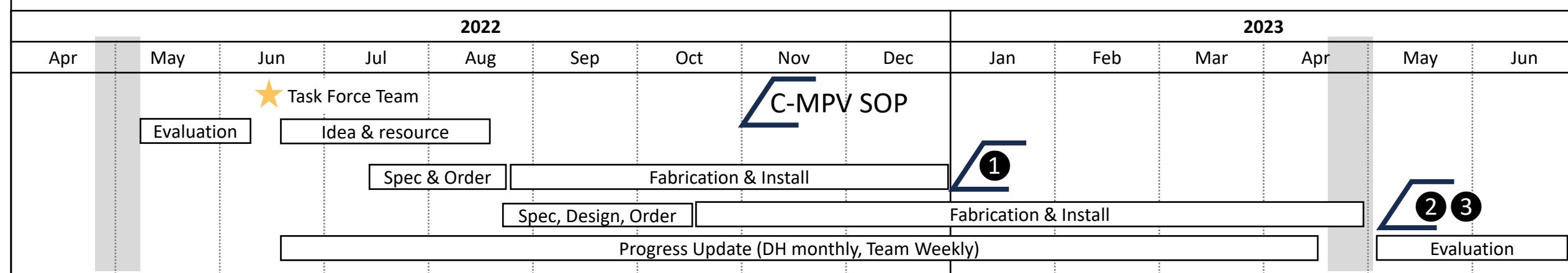
	Current	Target
 Cross Point	12x	Zero
 Outdoor Transfer	2x	Zero
 Big Part Long Distance Supply	1,165 m	Reduce 50%



Activity

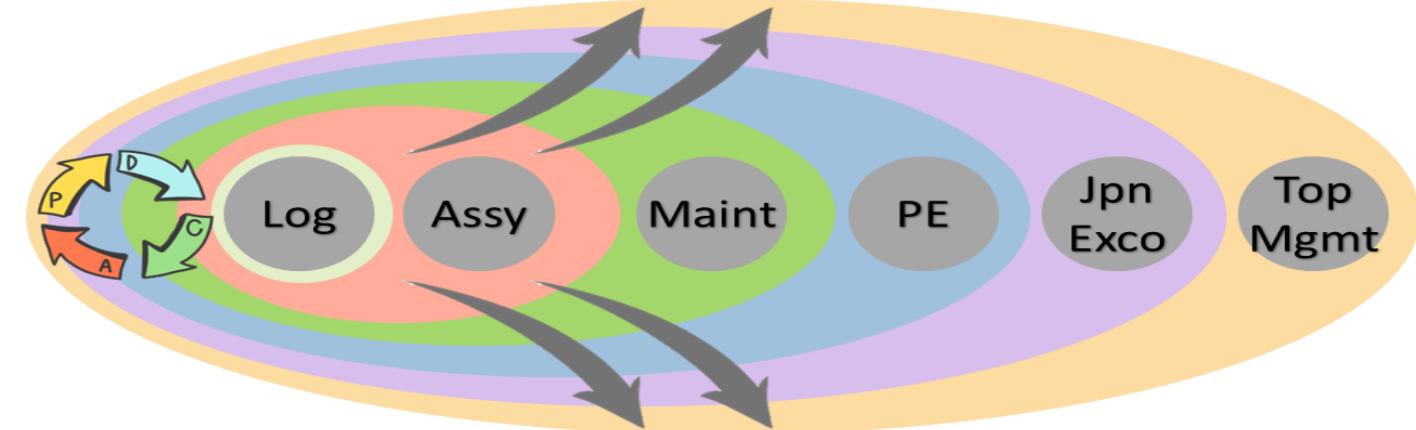
- ① Engine Store Relocation
- ② Door Line Relocation
- ③ TA Auto Transfer

ACTION PLAN



COMMUNICATION STRATEGY

Dept point of view → Company point of view
(Broader Common View)



Task Force Team Discussion

Sub Team Leader



Catur Ivan Sathya
Engine Store Relocation Door Line Relocation TA Transfer



Nemawashi



Strong Execution



Assign Team for each activity

Concept, Spec, Schedule, Investment allocation

Invite top management

Concept and management advice

Collaboration improvement and support

Installation and Relocation

BEFORE IMPROVEMENT

Supply Engine from Jundate to Engine Line



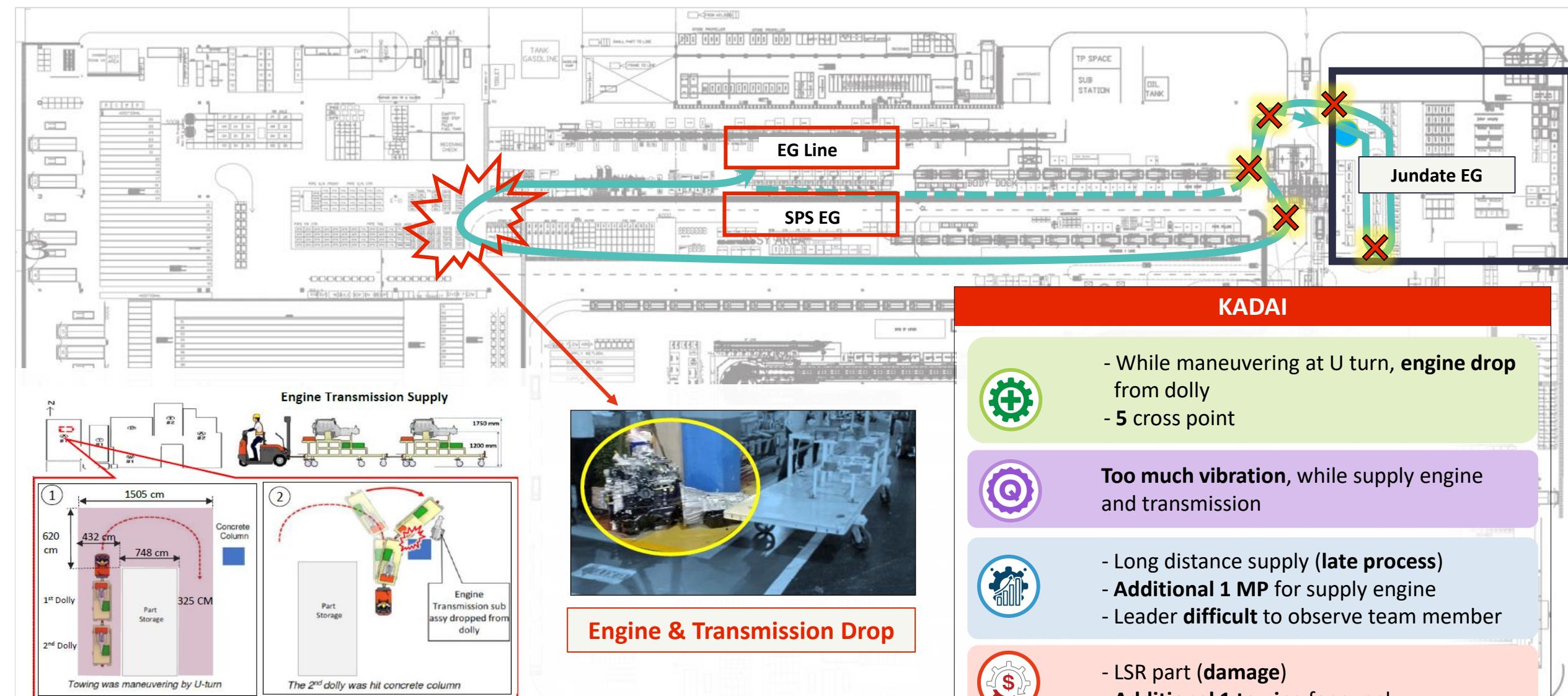
SSC



Safe



Automation



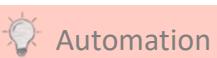
ALTERNATIVE IMPROVEMENT



SSC

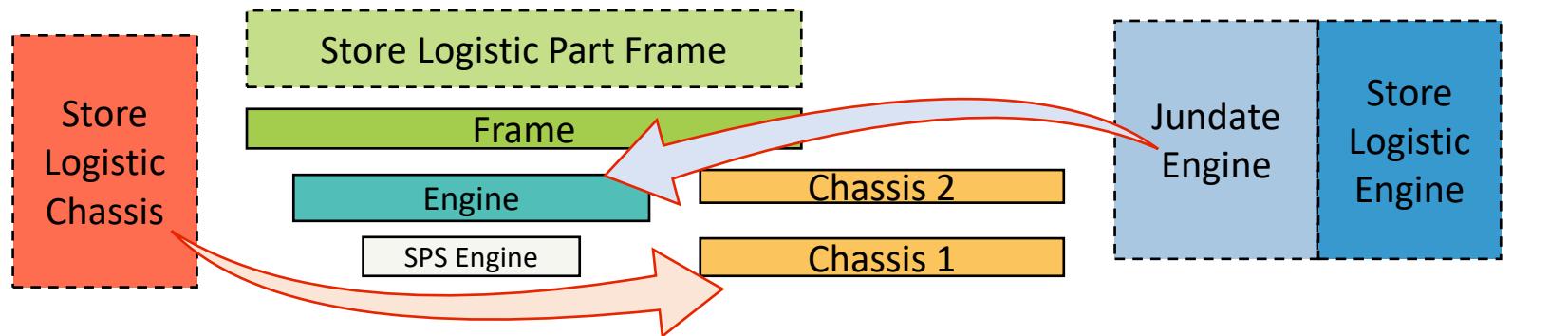


Safe



Automation

Toward Assembly kodawari: "SSC, Kinsetsuka, and Direct Supply"

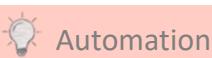


Kodawari Evaluation

Line	Kinsetsuka	Straight
Frame	O	O
Chassis	X	X
Engine	X	X

Option	Countermeasure	Merit	Demerit	Evaluation
Alt #1	Moving to area SPS Engine	- Close to EG Line - Easy monitor by Leader	- Logistic can not supply to inside line by Forklift - Additional Cross Point	X
Alt #2	Switch to Area Frame Part	- Close to EG Line - Easy monitor by Leader	- Frame Part will be not Kinsetsuka & Direct Supply - Need Install New Machine Transfer cross Frame Line - Big Construction	X
Alt #3	Switch Area Engine to Area Chassis Selected Option	- Reduce Long Distance & Cross Point - Kinsetsuka for Engine Part & Chassis Part - Reduce Maneuver Towing - Reduce 1 MP Supply - Easy Construction		O
Alt #4	Supply Part by AGV	- Can Reduce MP Supply	- Big Investment - Can not reduce cross point - Can Not reduce long distance supply - Need Add Maintenance for AGV	⚠

DETAIL ACTIVITY



Before Long Weekend

During Long Weekend

AREA	NO	ACTIVITY	VENDOR	P.I.C	Aug-22				Sep-22				Oct-22				Nov-22				Dec-22								Jan'23				Remark										
					WEEK				WEEK				WEEK				WEEK				24		25		30		31		1		WEEK												
					I	II	III	IV	I	II	III	IV	I	II	N	D	M	N	D	M	I	II	III	D	M	N	D	M	N	I	II	III	D	M	N	I	II	III	D	M	N		
Logistic Area	1	Install Partisi Wall Dock 45	Takenaka	Catur																																							
	2	Moving Kanban Room	Takenaka	Catur																																							
	3	Relayout Dock 45	Internal	Didik																																							
	4	Prep. Temporary Engine	Internal	Aris																																							
	5	Leveling Floor Dock 44	Edcon	Rustika																																							
	6	Prep. KBK RR Axle	MPS	Eko P																																							
	7	Prep. KBK Engine	MPS	Eko P																																							
	8	Line Fill 560B Utilization	Internal	Andl a																																							
	9	Prep. Facility Jundate Chassis	Todano	Ahmad																																							
	10	Moving RR Axle Store	MPS	Catur																																							
	11	Moving Stagger Engine	MST	Didik																																							
	12	Moving Store Engine	SINERGI	Didik																																							
	13	Moving Empty Sort Button Past	Internal	Catur																																							
	14	Moving Store Big Part Chassis	Internal	Aris																																							
	15	Moving Jundate Big Part Frame & Chassis	Internal	Aris																																							
Assembly Area	16	Moving Warehouse Maint	Takenaka	Ahmad																																							
	17	Moving Charger Towing	Todano	Edi Ivan																																							
	18	Prep Facility Jundate Engine	Kharisma	Eko P																																							
	19	Prep Facility SPS Engine	Asta Sami	Edi Ivan																																							
	20	Moving SPS Engine	Internal	Edi Ivan																																							
	21	Moving Machine Press Bushing	Todano	Edi Ivan																																							
	22	Moving Jundate Engine & Store	MPS	Ahmad																																							

Delay (2 days): Actual line is different 5 meters with before cond. (drawing not update)

Delay (2 days): Charger towing not clear yet w/ Mfg (add. req)

CHALLENGE

1. Unlevel Floor at new area

→ Need open space 200 m² during flooring (Utilize 560B space)

2. Tight schedule, only weekend construction

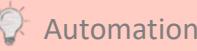
→ Need advance construction for Gantry & Rail



SSC



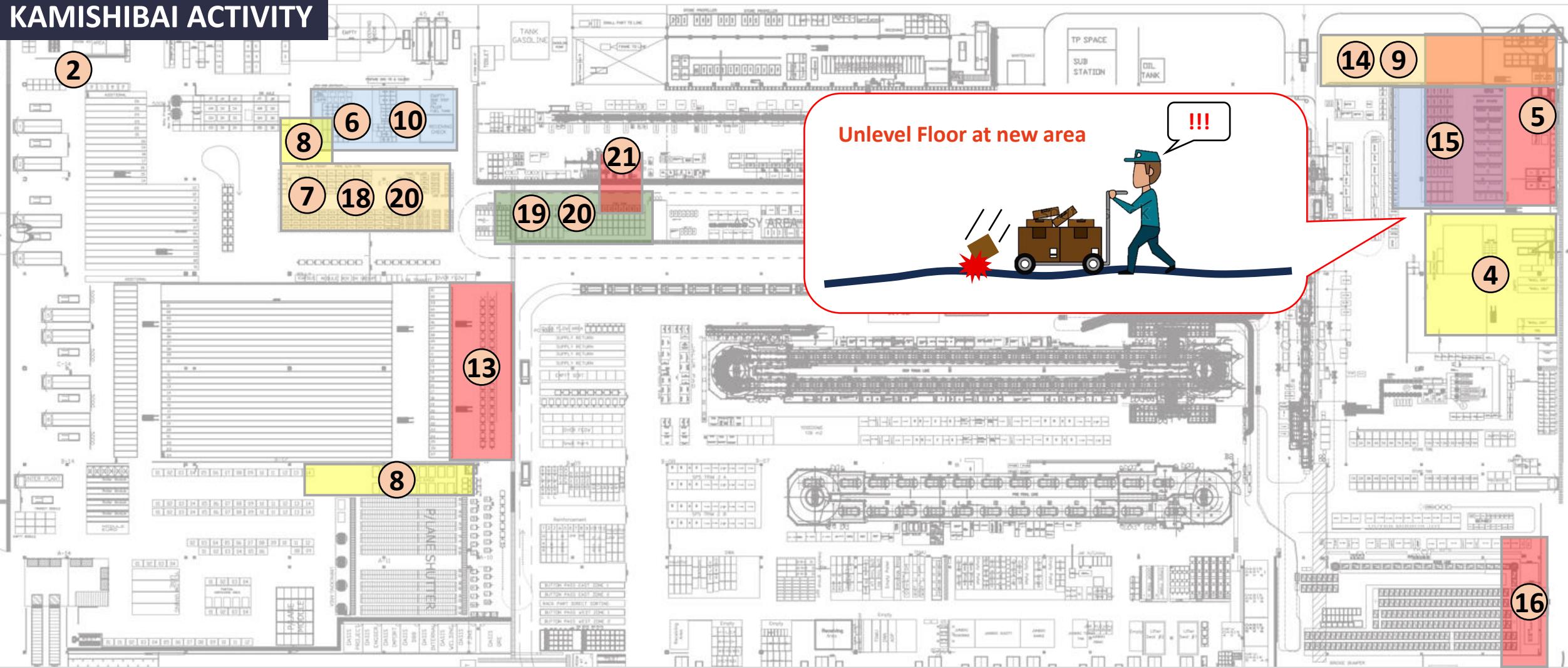
Safe



Automation

KAMISHIBAI ACTIVITY

2



AFTER IMPROVEMENT

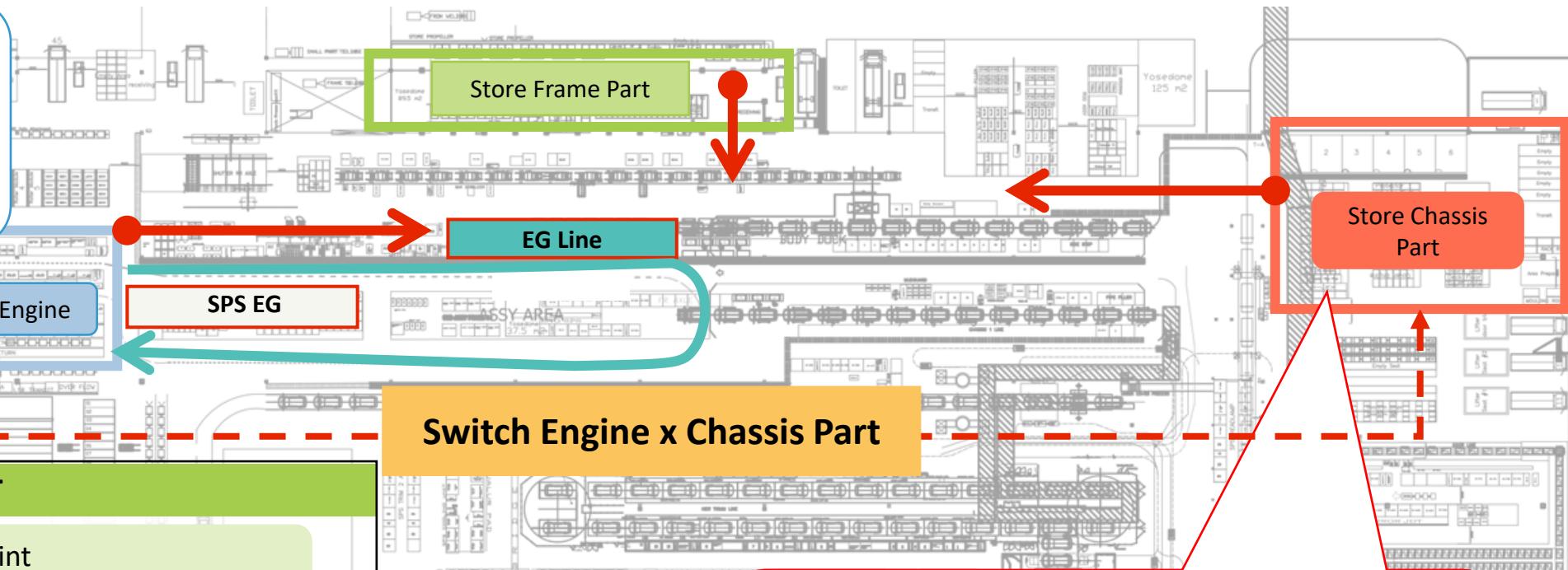
Relocate Store Engine (Switch to Chassis Part)



Safe



New Store Engine Part



BENEFIT



- Eliminate 5 cross point
- Eliminate dangerous towing maneuver



Kinsetsuka engine & chassis



Reduce supply distance to 155 meter/unit



Reduce 1 logistics man power



New Store Chassis Part

BEFORE IMPROVEMENT

Supply Door From Door Line to Final 4



SSC



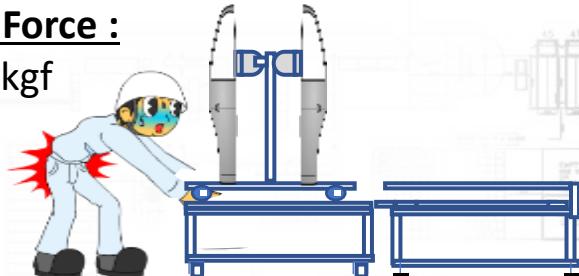
Safe



Automation

Push Force :

5 – 8 kgf



Manual Push & Pull

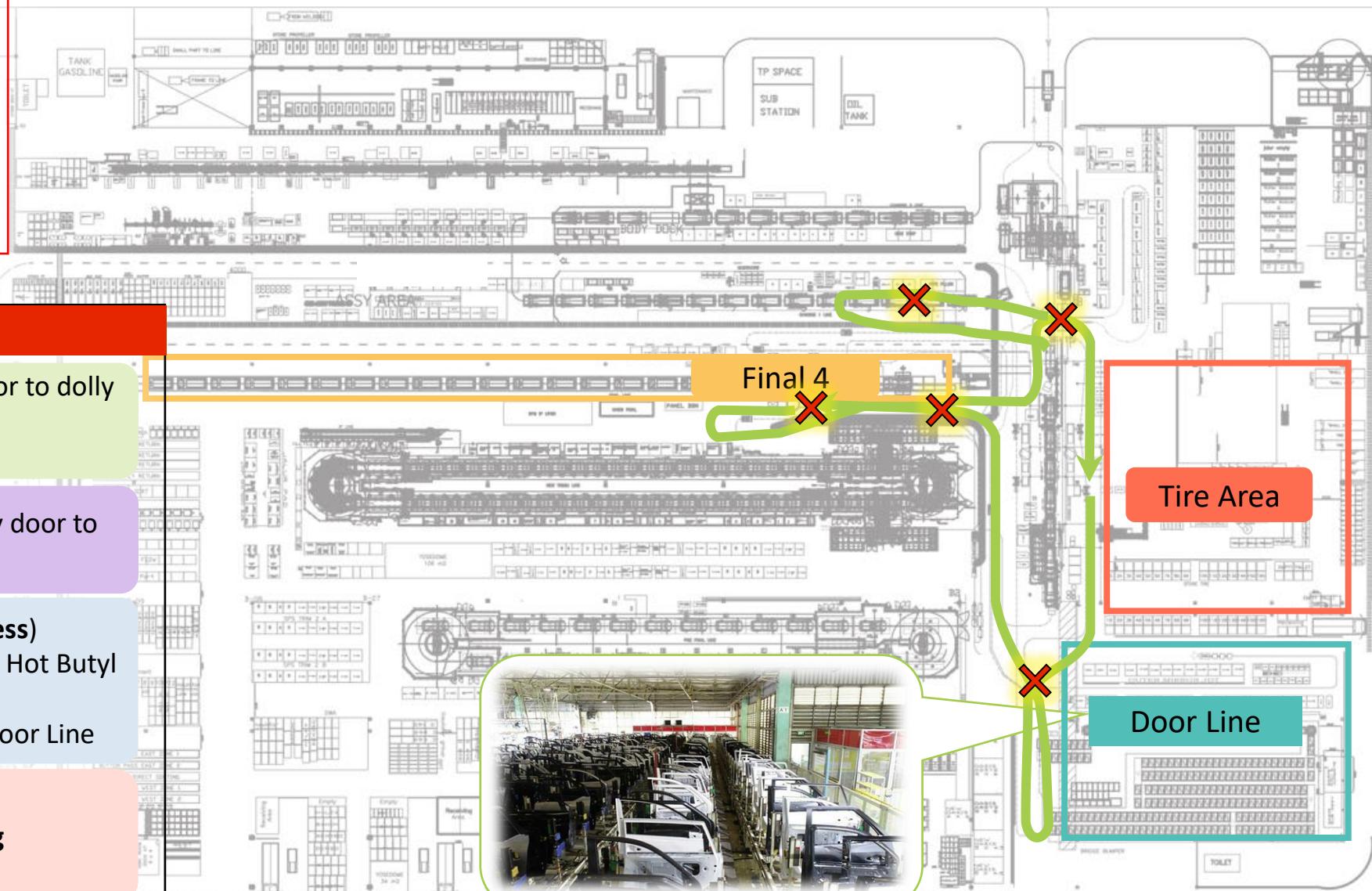
KADAI

- Ergonomic Issue, when take door to dolly supply door
- 5 cross point

- Too much vibration, while supply door to Final 4

- Long distance supply (**late process**)
- Difficult maintenance access for Hot Butyl Machine (**long tire repair**)
- Logistics **only supply 1 side** at Door Line

- Man power **supply 2 MP** (LH)
- Higher cost for **energy & towing** maintenance



ALTERNATIVE IMPROVEMENT



SSC



Safe



Automation

Toward Assembly kodawari: “SSC, Kinsetsuka, and Direct Supply”

Option	Countermeasure	Merit	Demerit	Evaluation
Alt #1	Switch to Area Chassis Part	- Reduce Long Distance Door - Kinsetsuka for Door - Reduce Maneuver Towing - Reduce 1 MP Supply - Make layout more flexible	- Chassis Part will be not Kintsetsuka - Additional Cross point For Chassis - Long Distance Supply For Chassis Part - Big Construction - Many Henkaten	X
Alt #2	Switch Door Line to Area Tire Sub Assy Selected Option	- Reduce Long Distance & Cross Point - Kinsetsuka for Door - Reduce Maneuver Towing - Reduce 1 MP Supply - Make layout more flexible	- Big Construction - Many Henkaten	O
Alt #3	Supply Door by AGV	-Can Reduce MP Supply	- Big Investment - Can not reduce cross point - Can Not reduce long distance supply - Need Add Maintenance for AGV	△
Alt #4	Over head Bridge Transfer Door	-Can Reduce MP Supply	- Big Investment - Big Construction - Can not reduce cross point - Can Not reduce long distance supply	△

DETAIL ACTIVITY



SSC



Safe



Automation

AREA	NO	ACTIVITY	VENDOR	P.I.C	Before Shutdown								During Shutdown										May-23				Remark	
					Feb-23				Mar-23				Apr-23					May-23										
					WEEK		WEEK		19	20	21	22	23	24	25	26	27	28	29	30	WEEK	I	II	III	IV			
Door Line	1	Relocate Door Storage	MPS	Ryan	Order	Preparation																						
	2	Relocate Door Conveyor	MPS	Ahmad M	Fabrication																							
	3	Relocate Door SPS	MPS	Ivan																								
	4	Relocate Andon	ADAPTIF	Ivan																								
	5	Modif.Storage x Conveyor	MPS	Ryan	Order	Design																						
	6	New Door Bridge	MPS	Ahmad M	Order	Kentokai																						
	7	Hot Butyle	SEI	Ali S	Order	Fabrication																						
	8	Lifter Part	TAIYO S	Ahmad M	Order	Preparation																						
	9	Relocate Oasis Maint	UBE	Ryan																								
	10	Relocate Empty Door	MPS	Ryan																								
	11	Upper Const. Door Conv.	MPS	Ahmad M	Order	Preparation																						
Tire Conveyor	12	Relocate Tire S/A	SHINMEI	Ryan																								
	13	Relocate Lifter Tire	SHINMEI	Ahmad M																								
	14	Reloc Lifter , Ext Conveyor	SHINMEI	Ahmad M	Order	Fabrication																						
	15	Piping and Lighting	Todano	Ivan	Order	Design																						
	16	Andon call	ADAPTIF	Ivan		Fabrication																						
	17	SPS Tire	SHINMEI	Ivan																								
Door Storage	18	Reloc.LLC, Bulk, Pump oil	SGT	Ali S	Order	Utility and Piping																						
	19	Reloc.Towing Charge	TAIYO S	Ivan																								

Delay (2 weeks): Door output system not clear yet w/ Mfg.

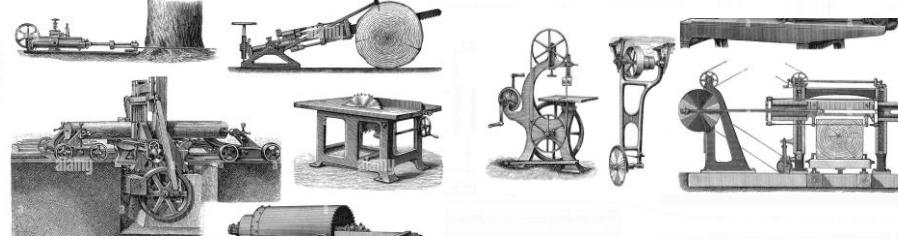
Delay (2 weeks): Not enough power cable

Delay (1 week): New area not clear yet

CHALLENGE

1. High Risk Activity: Relayout Old machine

→ Door : 10 Years, Tire : 18 years



2. Tight schedule of Relocation, only weekend construction.

→ Need advance construction for Facility
→ Less than 2 weeks for relocation

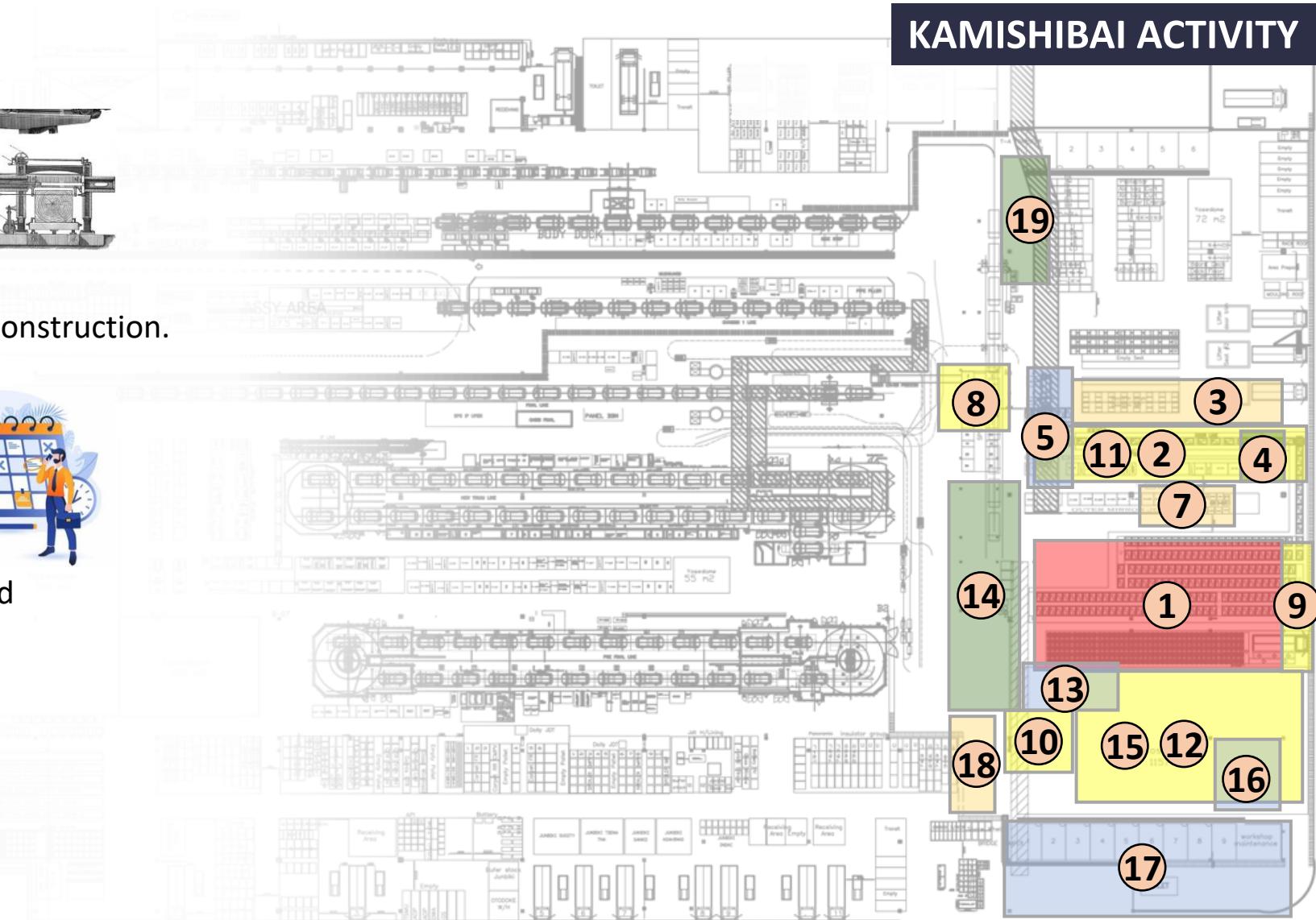


3. Big Construction

→ Many vendor and related function involved



KAMISHIBAI ACTIVITY



ALTERNATIVE #2 Relocate Door Line (Switch to Tire)



SSC



Safe



Automation

BENEFIT



- Eliminate **2 cross point**
- Eliminate **dangerous towing maneuver**
- Eliminate **ergonomic issue**, additional auto push puller



Kinsetsuka door line

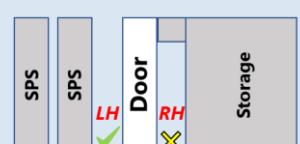


- Reduce supply distance to **87 meter/unit**
- Improve **maintenance access**
- Increase **open space**

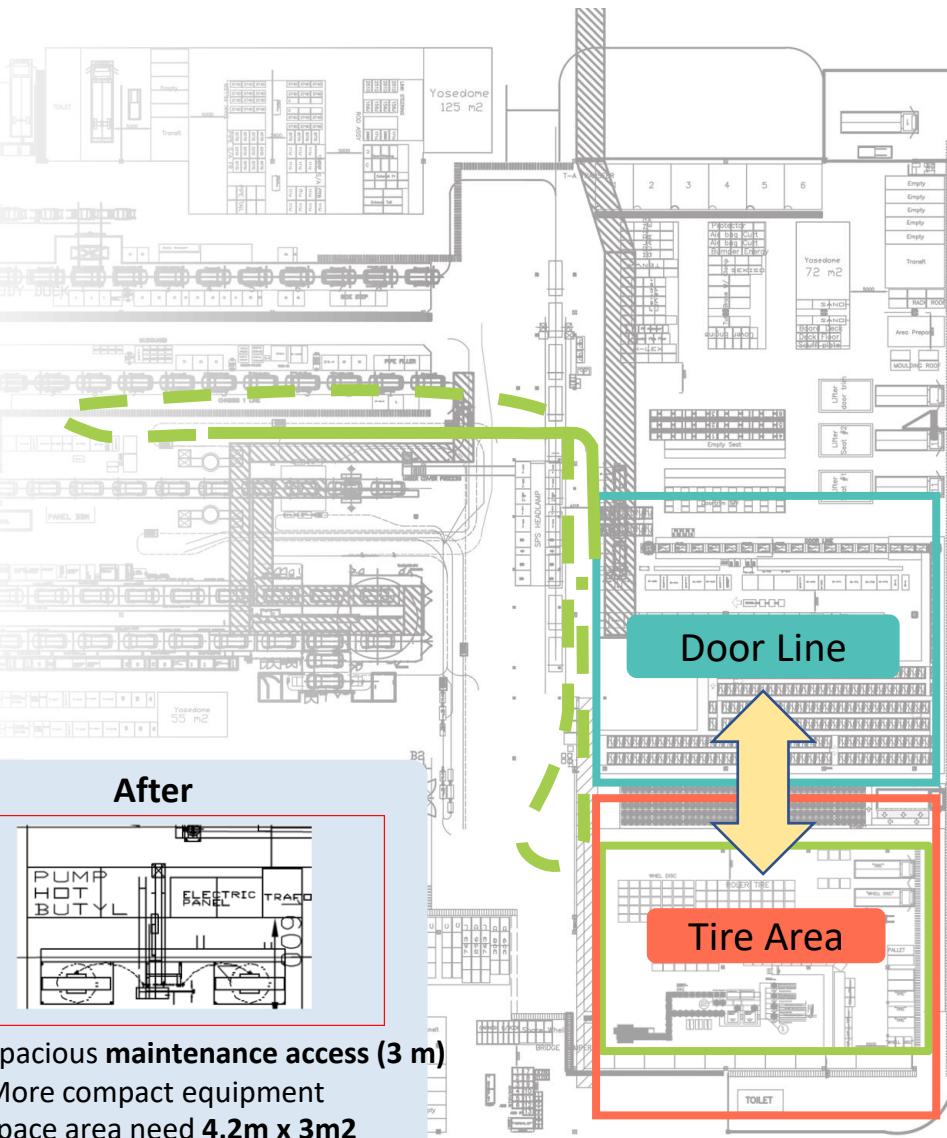
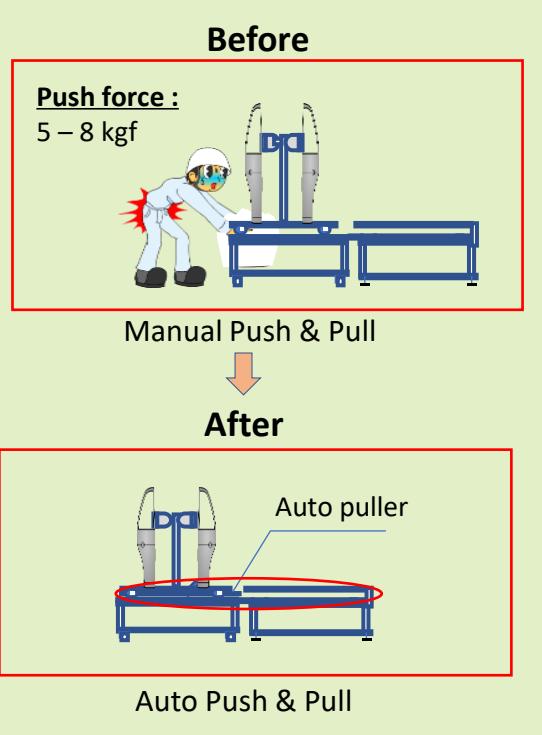
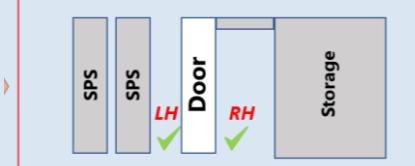
Reduce **1 MP supply**

Increase Open Space

Before



After



BEFORE IMPROVEMENT

Supply Body from Toso to Assy



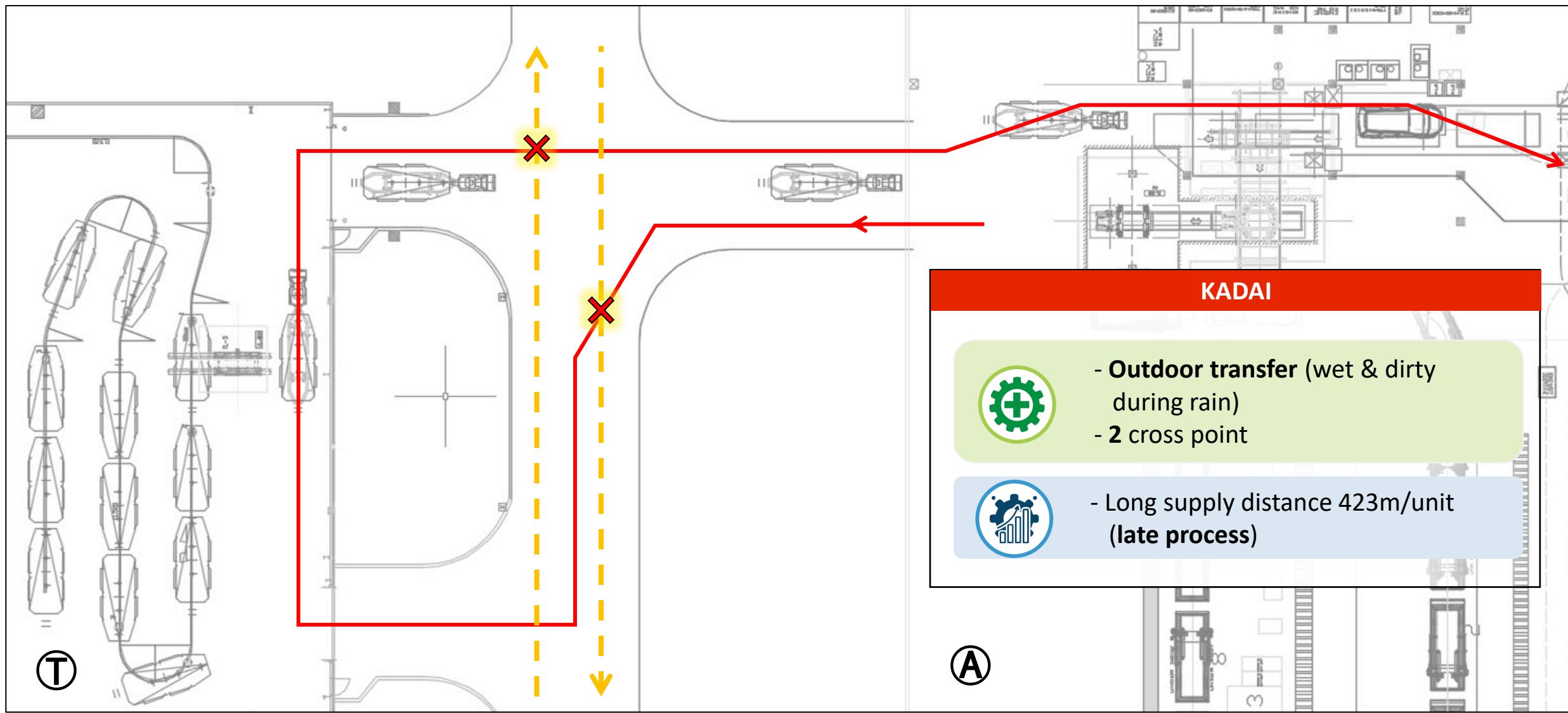
SSC



Safe



Automation



Legend:

 : body supply : frame supply

ALTERNATIVE IMPROVEMENT



SSC



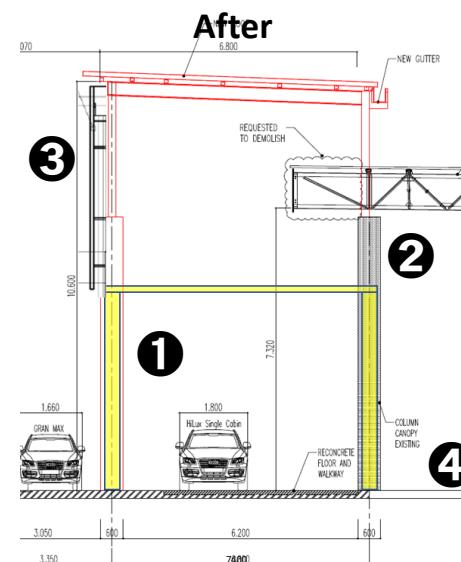
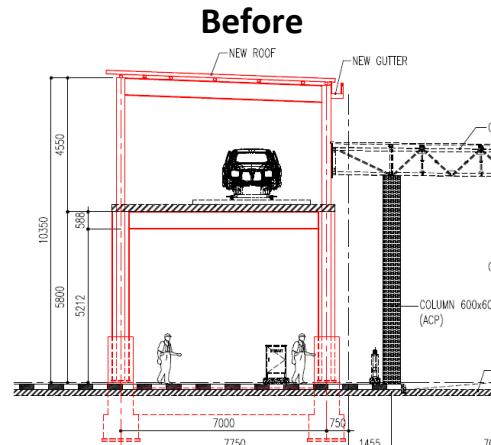
Safe



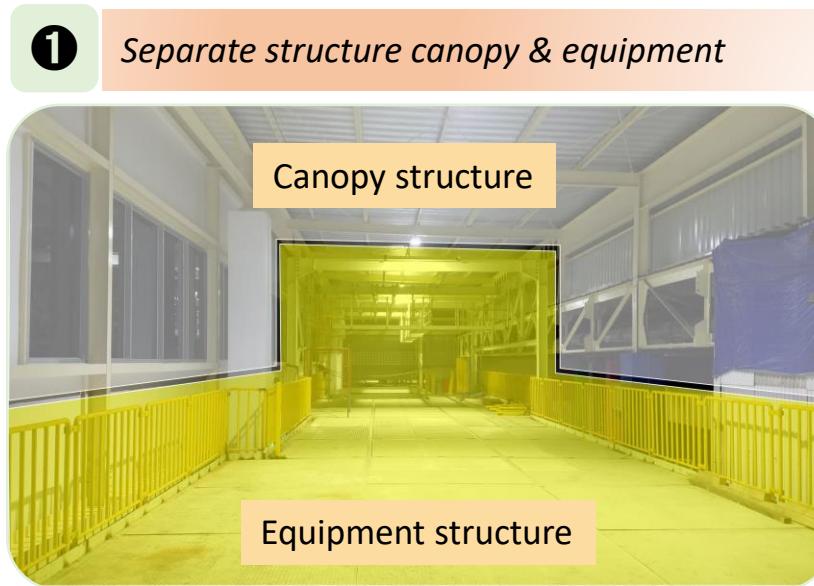
Automation

No	Kadai (Challenge)	Alternatives & PDCA			Evaluation
1	No impact to goguchi	New building for bridge	Full concrete	Long permit	X
				High cost	X
			Simple & slim building	Separate canopy & equipment structure	O
				Utilize existing column	O
2	Overbridge (zero crossing)	Vehicle lifting more than 6m (robot motion range limited)	Make lower bridge		X
			Elevation robot base (2m)		O
	High bridge for container truck (4.7m)		Elevation Toso conveyor (0.5m)		O
3	Painting small space	Utilize current conveyor	No space for new equipment	Modify toso conveyor	O
			Vehicle interfere with building		
			Vehicle lift & rotate 180°	Two post table lifter + rotary hanger	X
				Single post rotary table lifter	X
				Robot matehan	O
4	Common design WT transfer	Robot fork interfere dolly TA	Modify design dolly TA		X
			Add new lifter #1		O
		Dolly common interfere sealer application	Modify attachment dolly TA		O
		TL-5 as backup			O

“SIMPLE & SLIM” TA TRANSFER BUILDING



Cost Saving: 5.4 Billion Rupiah
Advance Sched.: 2 Months



SSC

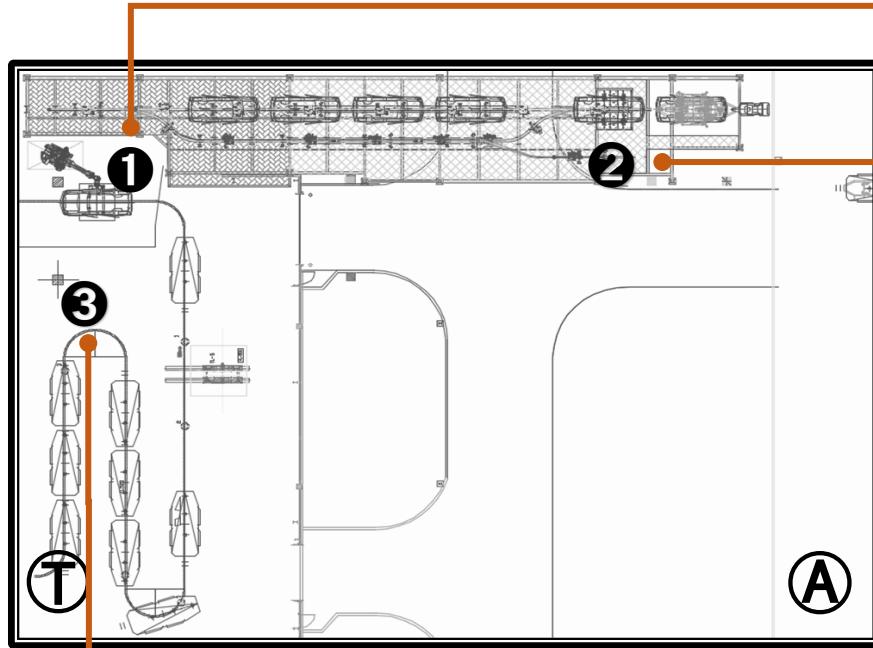


Safe



Automation

"AUTOMATION" TA TRANSFER



1

2

3

A

2

Toso Conveyor Modification (flexible)

Utilize TL-5 as backup



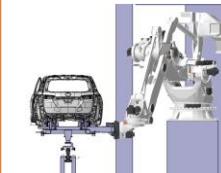
Rail Modification

TL-5 as Backup



Jiritsuka Robot Installation

Proceed independently by PE, safety, maintenance, and local vendor (Daifuku, Subaru, Unggul)



3D Simulation



Installation



Teaching



New Conveyor, Lifter, and OHC Hanger Installation

Consist of 3 Lifter, 70 m conveyor length, and 1 OHC Hanger



Robot x Lifter#1



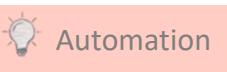
TA Conveyor



SSC



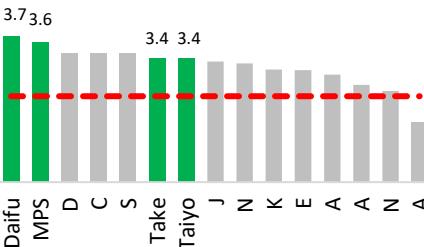
Safe



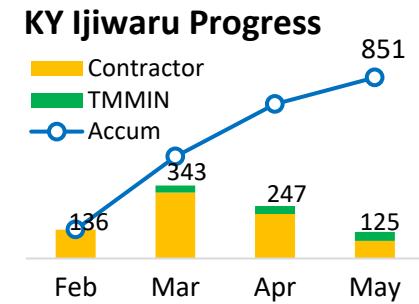
Automation

"SAFE" CONSTRUCTION

• [PLAN] CSMS Dev. (Workshop Development & audit)



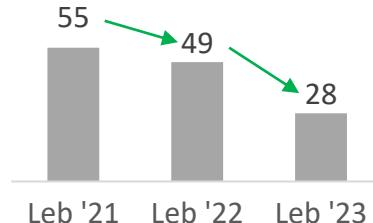
• [HUMAN] Lv up Awareness by Ijiwaru & Do & Don't



• [CONSTRUCTION] Proactive KY and Yorisoi Patrol

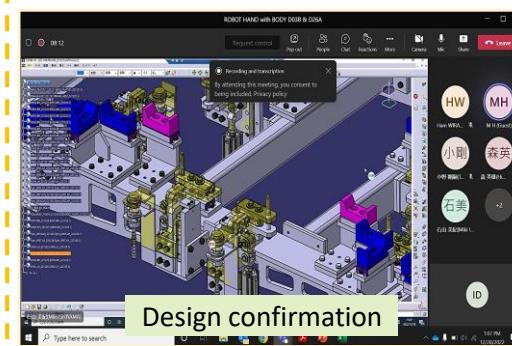
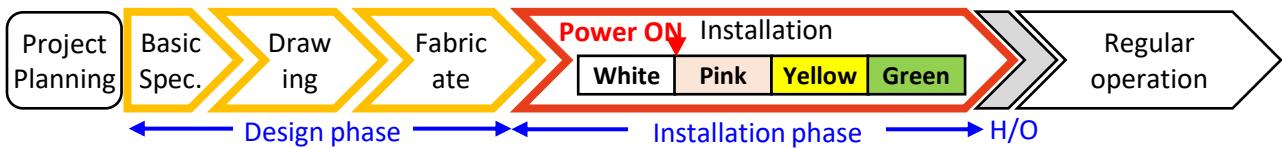


Finding at Lebaran S/D



MACHINE SAFETY ASSURANCE SYSTEM (MSAS)

Purpose → Ensuring implementation of safety assurance system in new and modified machine for the aim of preventing accidents caused by machine



Hazard type : MECHANICAL HAZARDS	Severity	M
Location :	Frequency	H
Hazard Detail :	Avoidance	I
Opening space, possibility orang menjangkau pergerakan mesin	Probability	H
	RISK LEVEL	5

Example Finding RA



“FLEXIBLE” TA TRANSFER EQUIPMENT



SSC



Safe



Automation

“Smooth & Flexible Equipment” → Easy PM and Quick 6 Repair (User friendly for enjoyable process)

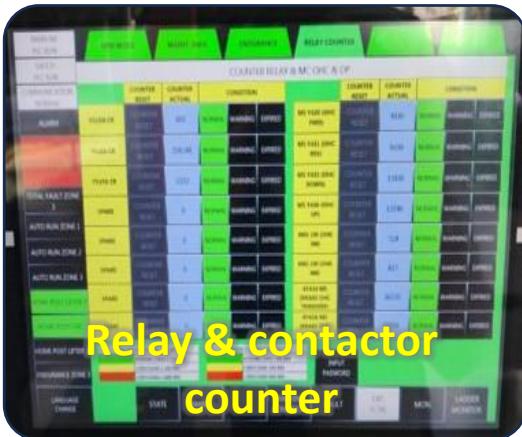
Proactive Maintenance

Preventive by Symptom

Occurrence Prevention

Symptom for Effective PM

1. Counter Relay
2. Counter Contactor
3. Cycle Time Over



Relay & contactor counter

Reactive Maintenance (Quick Repair)

Q1
Diagnosis

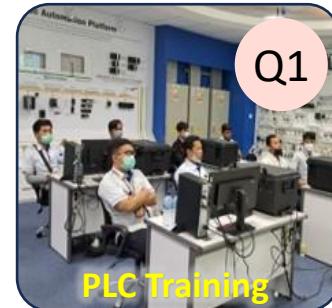
Q2
Spare Part

Q3
Tools

Q4
Workability

Q5
Setting

Q6
Backup



Q1
PLC Training



Q1
Visualize normal abnormal



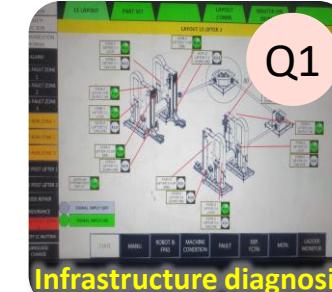
Q3
Skid CF



Q5
Skid Repair



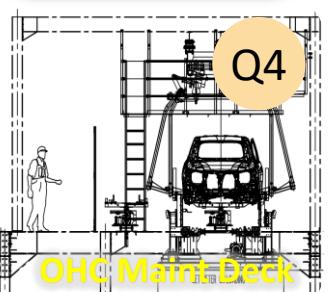
Q6
TL-5 as backup



Q1
Infrastructure diagnosis



Q2
Spare part set (ready to use)



Q4
OHC Maint Deck



Q6
Backup Option

AFTER IMPROVEMENT

Supply Body from Toso to Assy



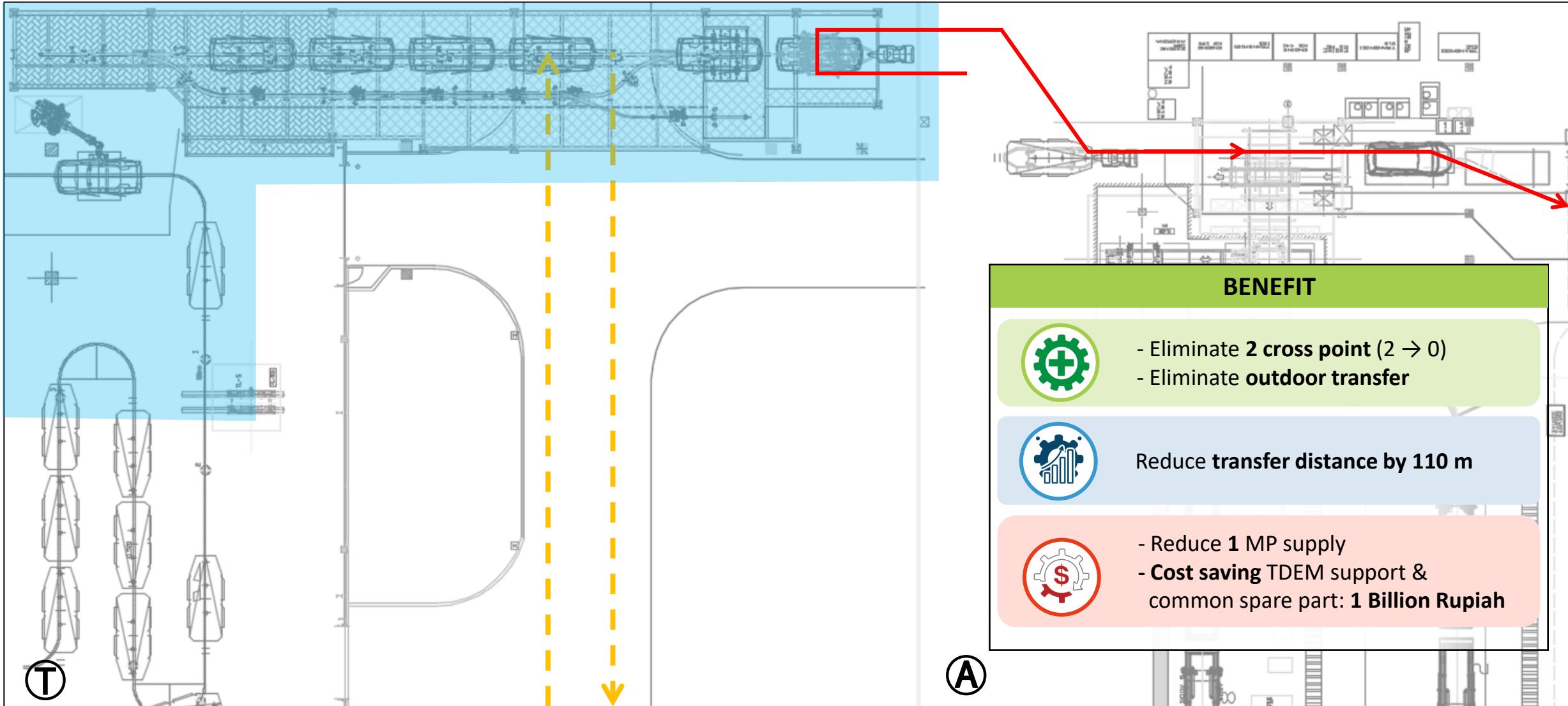
SSC



Safe



Automation



Legend:

— : body supply

- - - : frame supply

ASSEMBLY BIG PART ROUTE AFTER IMPROVEMENT

Frame

Toso

Body

EG Line

Jundate Engine

ASSEMBLY BIG PART ROUTE BEFORE IMPROVEMENT



Engine Drop

Outdoor Transfer



Frame

Toso

Body

Engine & TM

Cross Point

Big Part Long Distance Supply



PRODUCTIVITY

- Reduce transfer distance 352m/unit (1165m → 720m)
- Reduce 8 MP for transfer (24 MP → 16 MP)

COST

- Utilize spare towing for T/T Up (Save 1.2 Billion Rupiah)
- Cost saving from improvement & PDCA activity (Save 6.4 Billion Rupiah)



SAFETY

- Reduce crossing point (12 → 3)
- Eliminate dangerous towing maneuver
- Eliminate new equipment risk
- Eliminate uncomfortable outdoor transfer (wet)

QUALITY

- Eliminate engine part damage

HR

- Increase teamwork between PED, APPD, PAD, and PuD
- Level Up skill & knowledge in new technology
- Increase in house competitiveness

Explain “Assembly #1 Ideal Layout” to Mr. Masahiko Maeda, TMC Asia Region CEO and Mr. Yokishi Konishi, TDEM President



Maeda san:

Important point is our mind to proceed with clear concept (SSC, Direct Supply, and Kinsetsuka). TMMIN make good effort to realize this SR with speedy action. Please continue to expand this SR mindset to global

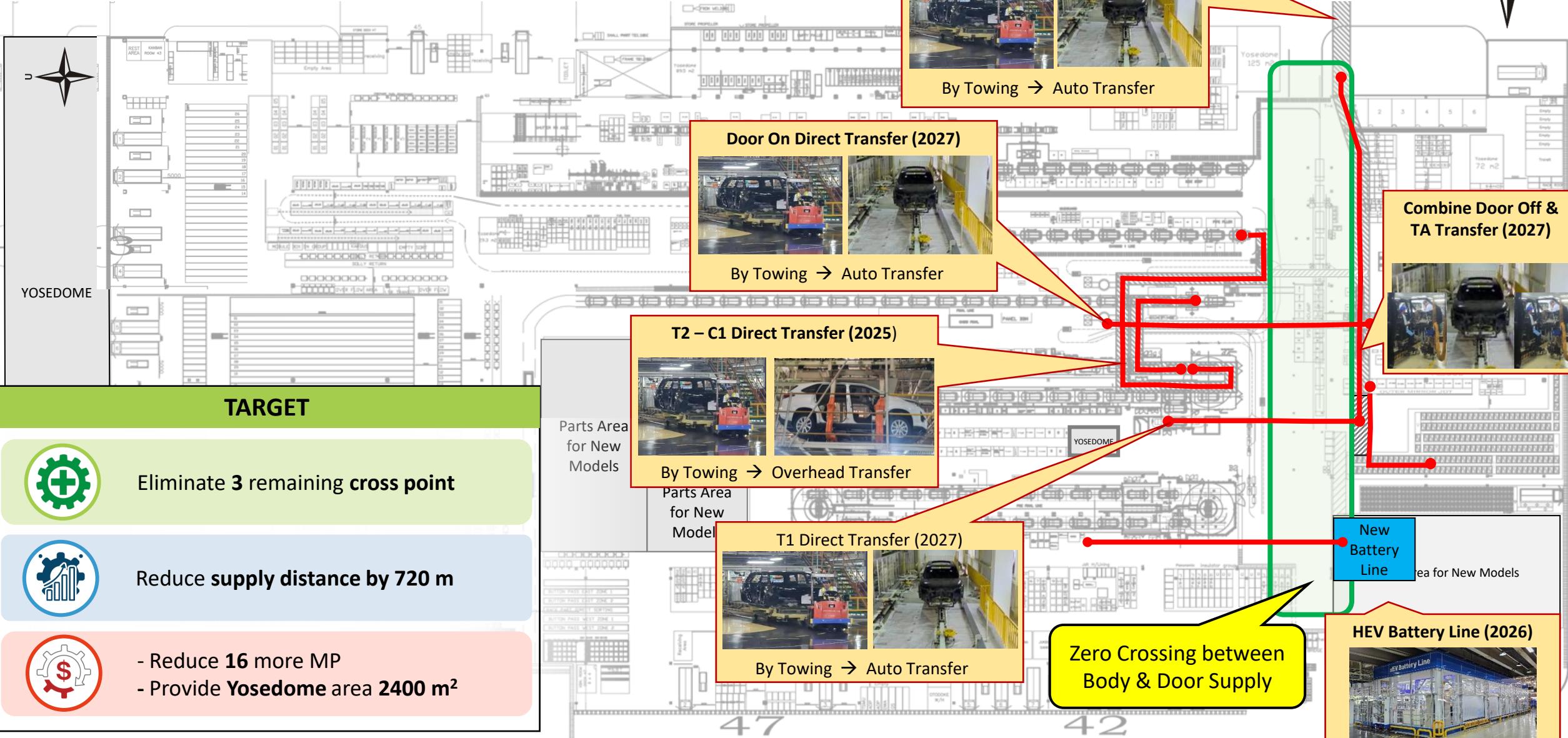


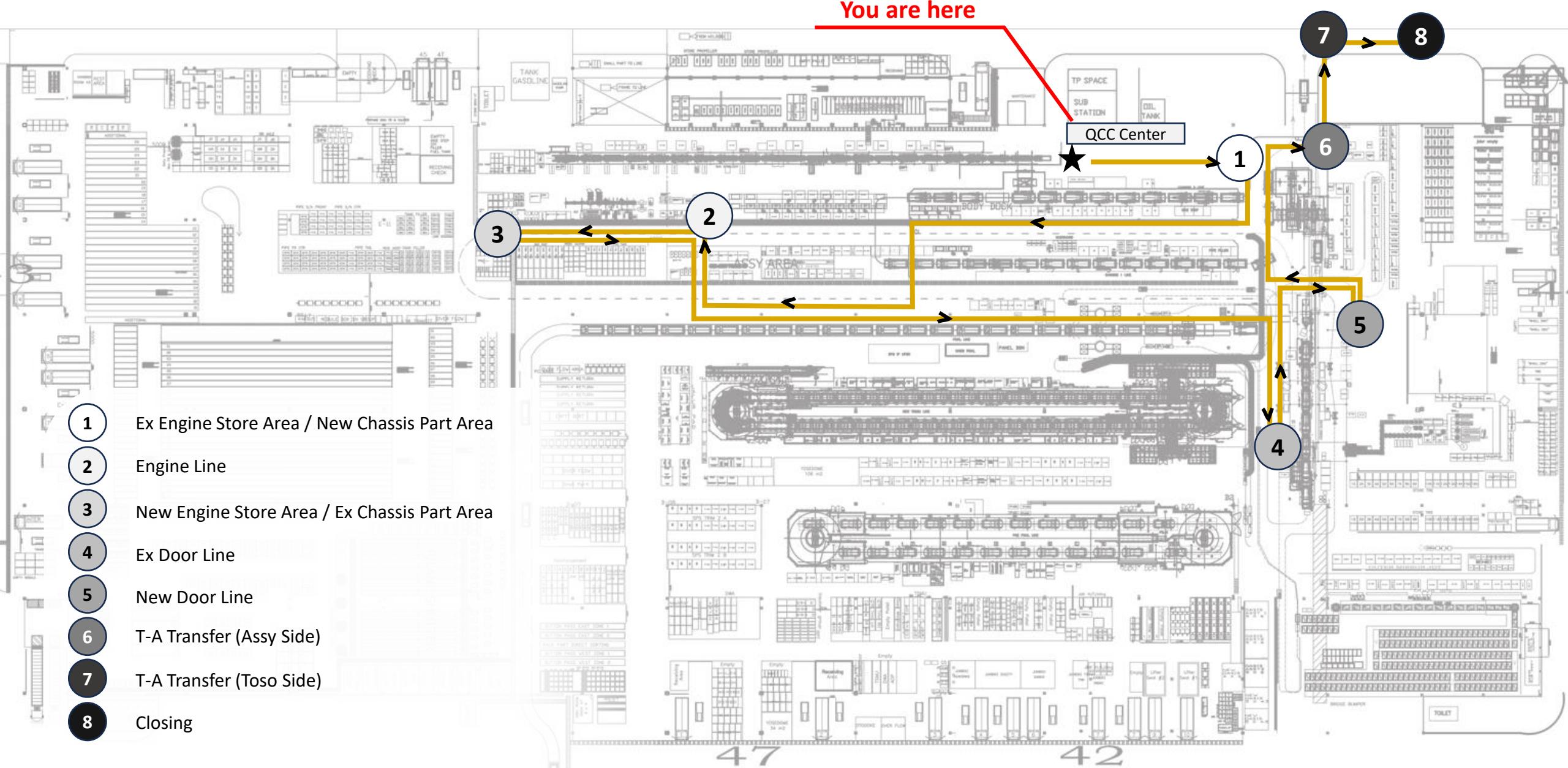
Konishi san:

Keep proceeding Structural Reform to get IDEAL LAYOUT. Please ensure process and product quality for customer smile.



NEXT ACTION UNTIL 2027





UTAMAKAN KESELAMATAN

TOYOTA
INDONESIA
PT Toyota Motor Manufacturing Indonesia

SPEEDY

PED

THANK YOU

