

From “slum” to “global” factory

Paritud Bhandhubanyong

Panyapiwat

Institute of Management

&

Pipob Vivatanaprasert

Thai Metro Industry (1973) Co.,Ltd.

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THAI METRO INDUSTRY (1973) CO.,LTD.



MR. PIPOB VIVATANAPRASERT

MANAGING DIRECTOR

Company Profile



Name : Thai Metro Industry (1973) Co.,Ltd.

Establish : 1973

Shareholder : Thai 100%

Capital : 40 Million Baht

Capacity : 100,000 pieces /year

Employee : 80 persons

Area : 4,200 sq.m..

Certificate : ISO since 2000 (current version ISO 9001 : 2015)



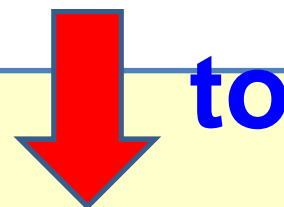
Certificate No. TH00/0000



Certificate Number TH00/0000



Thai Metro Industry (1973) is a chain manufacturing company with brand ICM. The firm has been in operation for more than 40 years. The firm used to employ more than 400 employees with export to USA and Europe. The company operated at a loss for quite a long year so the policy had been changed.



We will manufacture high quality product for high quality market. We aim to make better quality than Japanese product. Consequently, we emphasize on R&D and continuous process improvement for better quality, lower cost, timely delivery to achieve customer satisfaction.



At present, we are one of the global chain manufacturing leader. Our major customers are

- Siam Kubota Corporation (Thailand)
- KUBOTA Corporation, Japan
- Other industry major producers e.g. Sugar, Cooking Oil, Iron and Steel, Food, etc.

Product Lineup



Standard Industrial Chain: Number

80, 80D, 100, 100F, 100H, 120G, 120D, 140G, 140D, 160G, 160D, 180G, 180D, 200G, 200D, 240G, C2050, C2060H, C2080H, C2100H, C2120H, C2160H, C05075R, C05100R, 81XNN Single, Double, and Multiple Layer, or Custom made for customer



Product



Agricultural roller chain



Standard roller chain



Sugar mill chain



Conveyor chain



Straight sidebar chain



Customized chain

Custom made and manufacture of chain, fair price and on time delivery

Customer



กลุ่มบริษัทน้ำตาลไทยรุ่งเรือง
THAI ROONG RUANG SUGAR GROUP



Thai President Foods Public Company Limited



อ่ร่อย... อุกใจ



TOSHIBA

TOSHIBA (THAILAND)



TATA STEEL (THAILAND)
1/24/2018



Bangkok Expressway
Public Company Limited



Mahaphant Fibre-Cement Public Company Ltd.

Malee BRAND

From Slum to Clean Factory



1/24/2018

Slum Factory

to

Clean Factory





สถิติความปลอดภัย SAFETY RECORD



เกิดอุบัติเหตุครั้งสุดท้ายเมื่อ

030157

LAST ACCIDENT OCCURRED

เราทำงานมาแล้ว

1431 วัน

เป้าหมาย

365 วัน

WE HAVE OPERATED

DAYS TARGET

DAYS

เราเคยมีจำนวนวันที่ไม่มีอุบัติเหตุถึงขั้นหยุดงาน

368 วัน

THE BEST RECORD

DAYS



Thai Metro Way

1. R and D to achieve global best quality level

2. TPS (Toyota Production System) and LRP

(Loss Reduction Process) practitioner

3. Management by Walking Around (MBWA) to create total commitment

4. Problem Solving by Gemba ,Gembutsu, and Genjitsu

5. Continuous Human Resources Development

Thai Metro Way



THAI METRO INDUSTRY
TCM

วิถีไทยเมโทร

1. ต้องทำวิจัยและพัฒนาสู่ระดับโลก
2. ทำ TPS (Toyota Production System) และLRP (Loss Reduction Process)
3. สร้างความมุ่งมั่นร่วมกันโดยใช้ Management by Walking Around (MBWA) : การจัดการโดยการเดินดูหน้างาน
4. ต้องแก้ปัญหา โดยใช้ Gemba (สถานที่จริง) Gembutsu (ของจริง) Genjitsu (สภาพจริง)
5. ต้องพัฒนาบุคลากรตลอดเวลา

QCC THAI METRO

ประสานความคิด พิชิตปัญหา
พัฒนางานก้าวไกล ไทยเมโทรร่วมใจทำ QCC




TMI Mission 2014- 2020

Manufacture of global quality chain and transportation equipment focusing on

1. Continuous Research and Development
2. Toyota Production System (TPS)
3. Loss Reduction Process LRP
4. 5M → Excellent
 - ❖ Manpower
 - ❖ Machine
 - ❖ Material
 - ❖ Method
 - ❖ Measurement

Pathway to modern factory

<p>2014</p> <p>KAIZEN</p> <p>QCC</p> <p>CSR</p> <p>TPM</p> <p>ISO 14001</p>	<p>4 August 2015</p> <p>3Rs-Reduce/Reuse/Recycle</p> <p>Energy Efficiency</p> 
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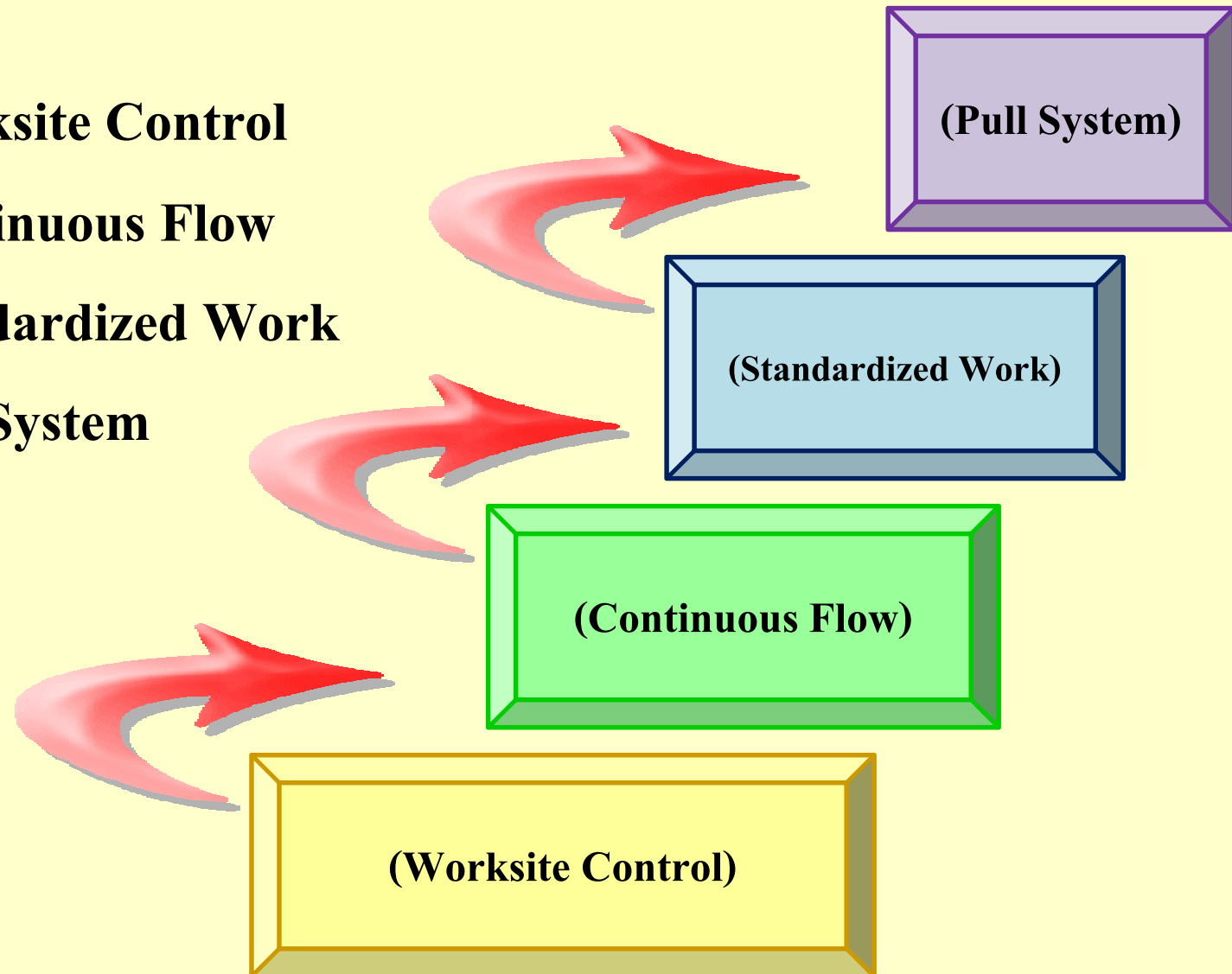
TPS (Toyota Production System)

STEP1 Worksite Control

STEP2 Continuous Flow

STEP3 Standardized Work

STEP4 Pull System



2 S: Cleanliness & Orderliness

Before



After

FIFO control



Flow rack

Area: Furnace Section

Key point: Application of flow rack and lighter containers (15 kg)

Weak point: Transfer of parts without FIFO due to pallet and heavy containers (40 kg.)

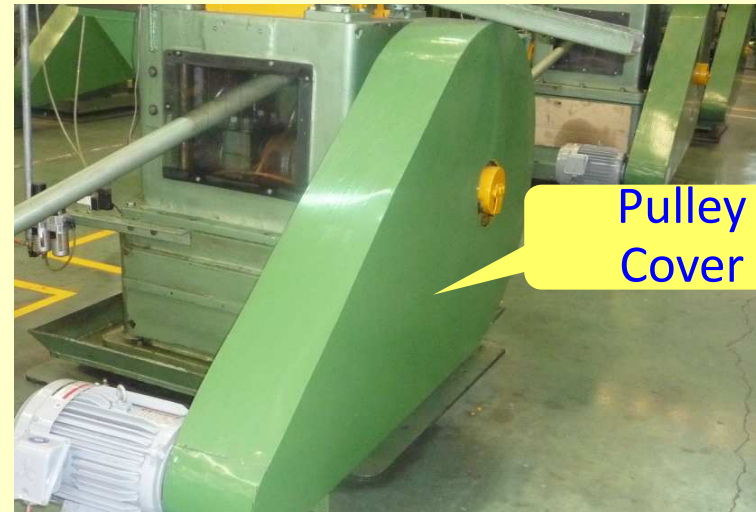
Merit: Successful application of FIFO, correct parts transferred and lighter load for operator

Safety

Before



After



Area: Hole Punch

Key point: Pulley Cover

Weak point: No guard at machine moving parts

Merit: Ensure of safety operation for employee

Machine and equipment control

Before



After



Area: All process

Key point: Attached identification label to specify the meaning of the light

Weak point: No identification label of tower light

Merit: Employee could understand the meaning of light color and could act accordingly.



Toyota Project (TPS) Phase 16+ Phase 20

TPS (Toyota Production System)



Continuous Kaizen : 100G

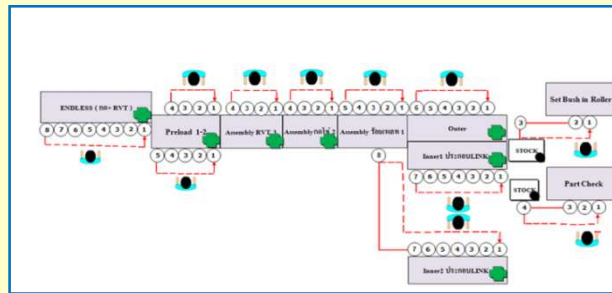
Manpower

11 → 7 → 4 Persons

Layout

Manpower

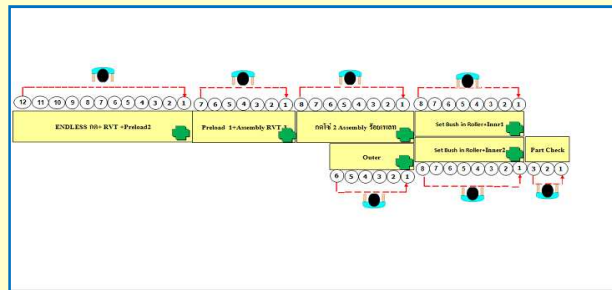
1.



Persons

Before Phase 16

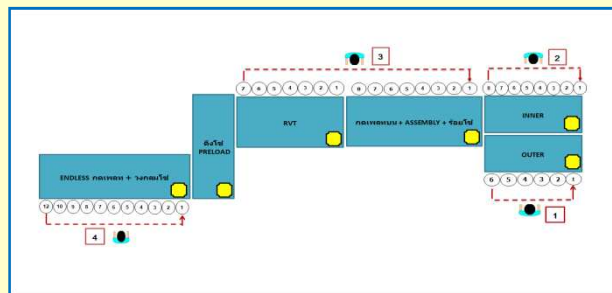
2.



Persons

After Phase 16

3.



Persons

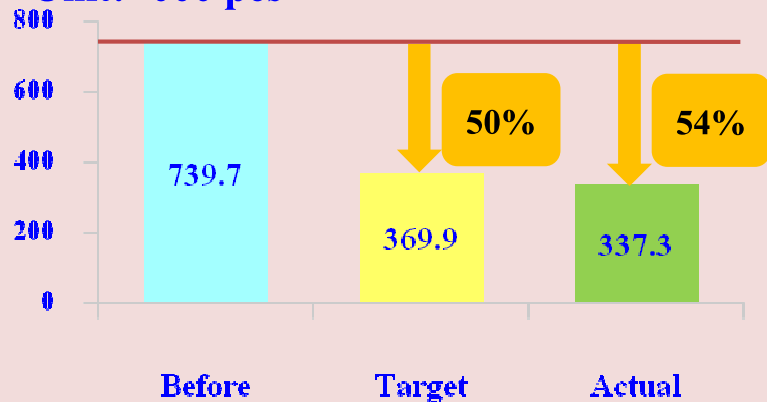
Follow Up Phase 16



Overall TPS results Phase 16

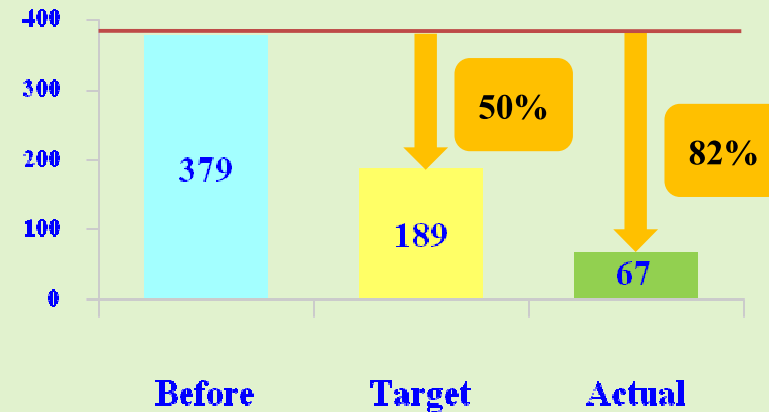
Reduce WIP

Unit: '000 pcs



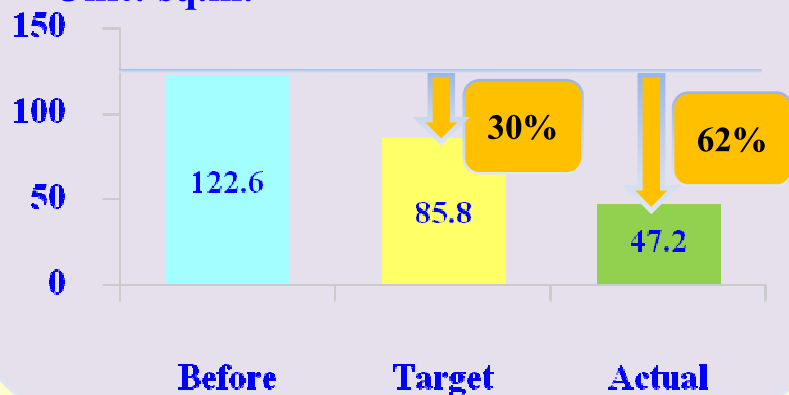
Reduce lead time

Unit: hrs



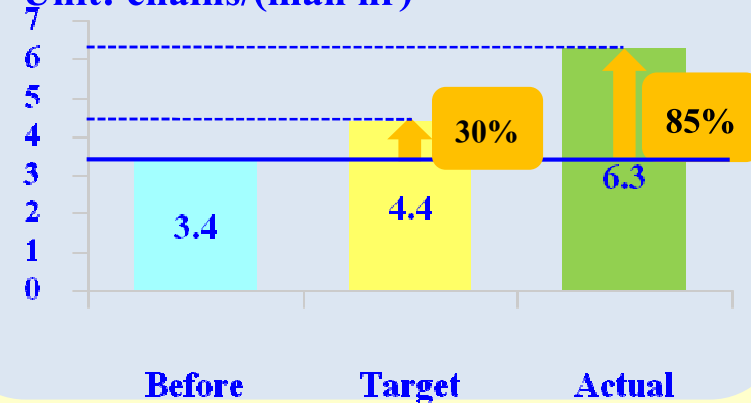
Reduce area

Unit: sq.m.



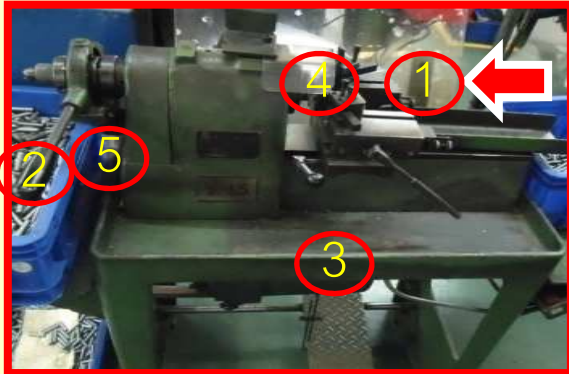
Increase productivity

Unit: chains/(man-hr)



Jidoka of Lathe

Before



5 operation steps

1. Insert pin in the chuck
2. Push lock lever to lock the pin
3. Push pedal to operate motor
4. Push cutter to chamfer pin
5. Pull lock lever to release the pin



Add vibration feeder cup and retrofit lathe for semi-auto operation with one step, one side chamfer

1. Put pin into the cup

After



Install two motors approaching work piece from left and right to achieve fully automated operation with just one step for both side chamfer.

Area: Pin cutting

Key point: Reduction of operation from 5 to one semi-automation to fully automatic or Jidoka.

Weak point: 5-step operation for operator

Merit: Streamline of operation and workforce reduction

Ventilation Fan



Before

After



Area: Furnace unit

Key point: Install ventilation fan

Weak point: No ventilation to dissipate heat

Merit: Cool and calm working environment

Crucial working principle according to TPS



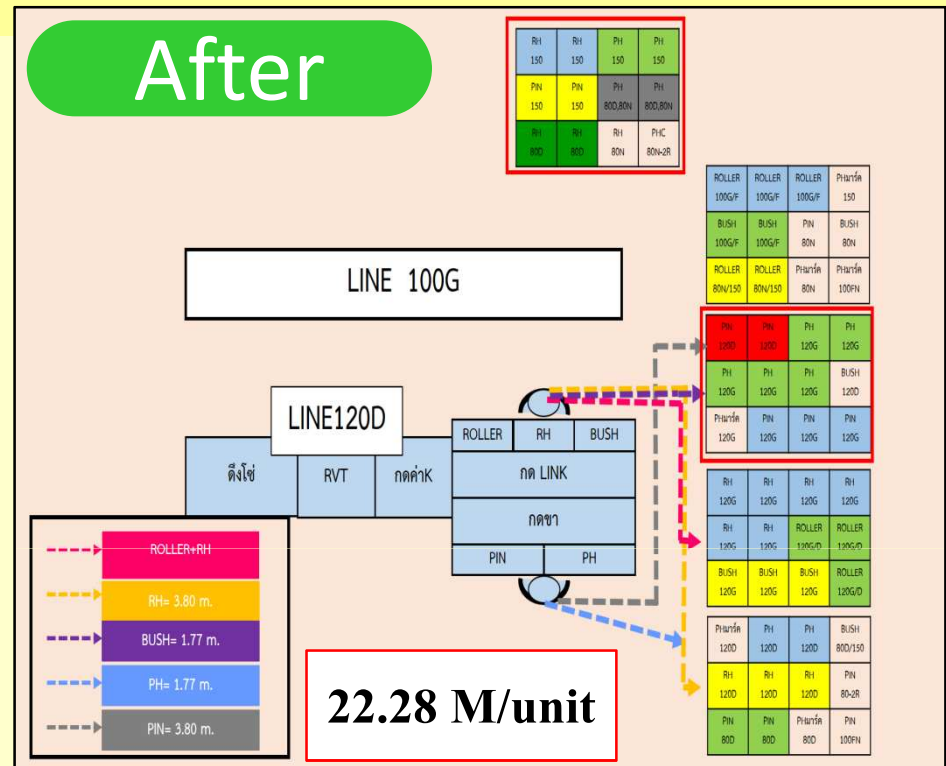
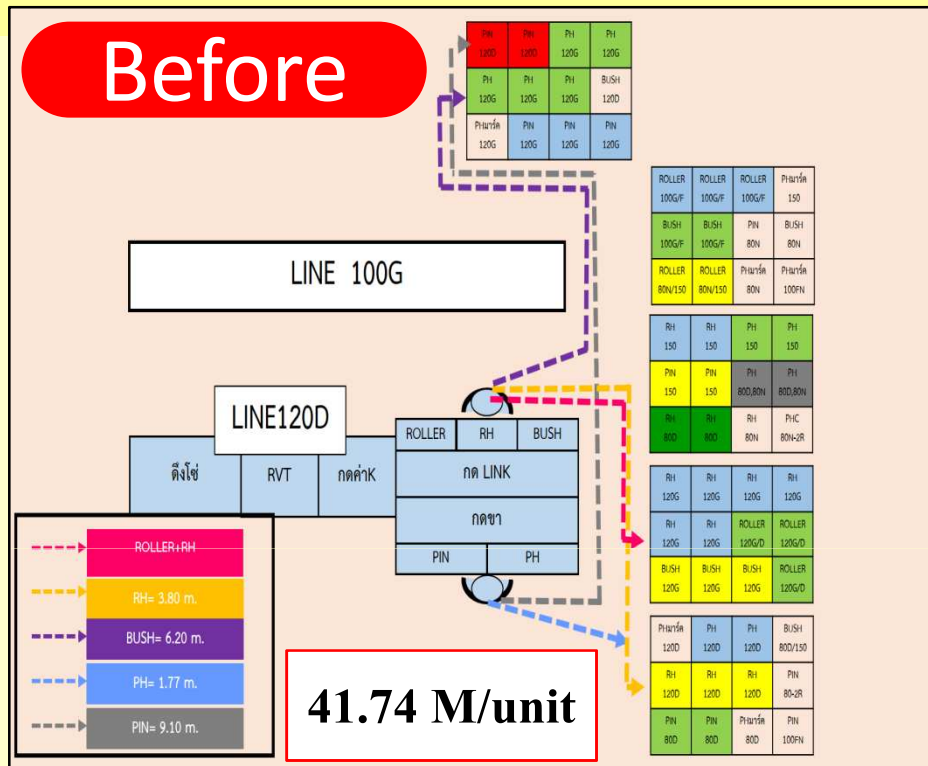
...Stop → Call → Wait



In-house training for QCC and activity presentation



QCC (Quality Control Circle)



Area: Assembly Unit

Key point: Move flow rack nearer to the assembly line

Weak point: Long walking distance to pick up parts to assemble 120D

Merit: Reduce walking distance to pick up parts

Kaizen

Add of automatic push pin



Before



After



Area: Chain assembly

Key point: Add of automatic push pin

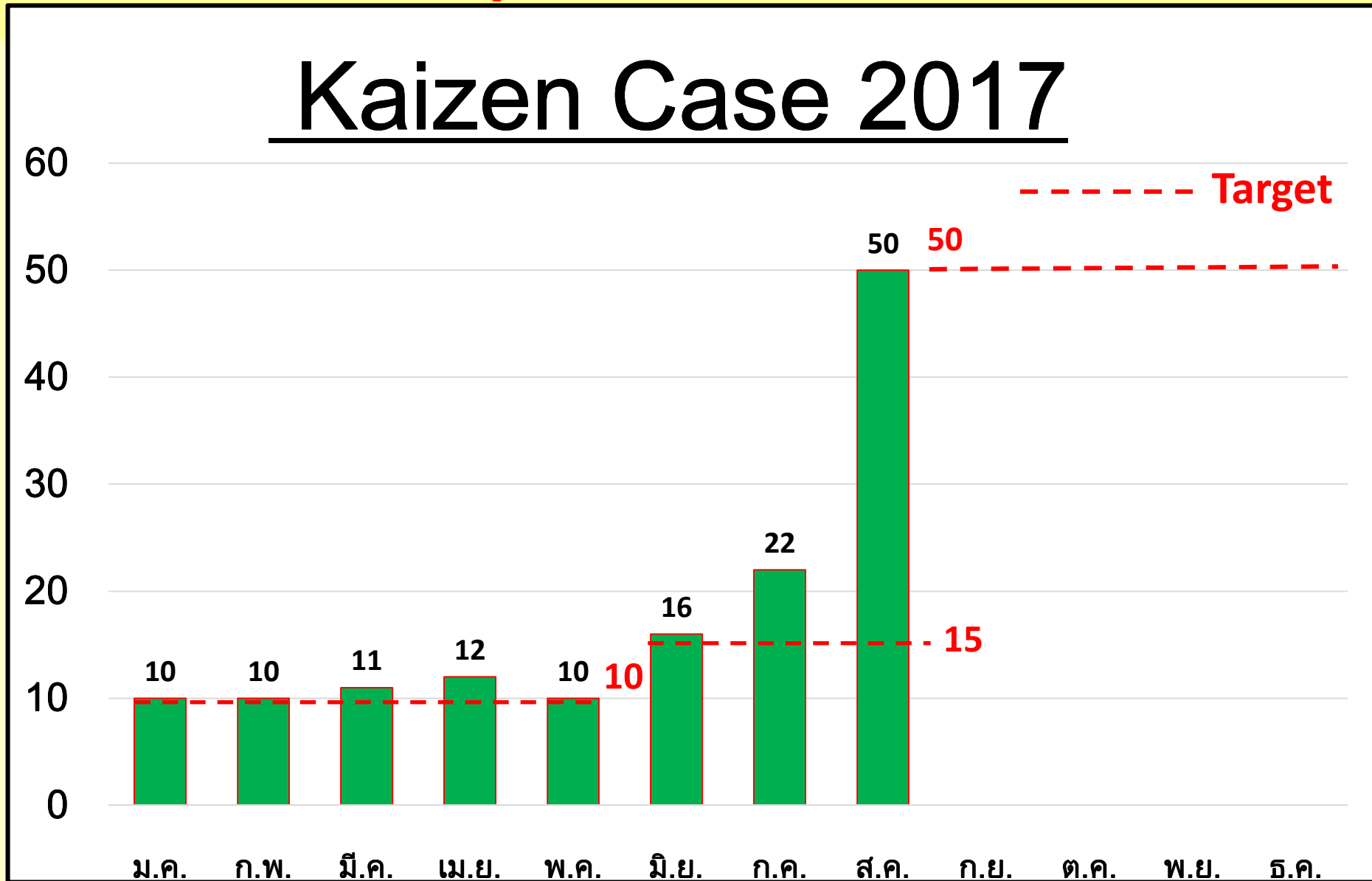
Weak point: Use of steel rod to pull out roller link by operator

Merit: Productivity Improvement



Kaizen Activity

Kaizen Case 2017





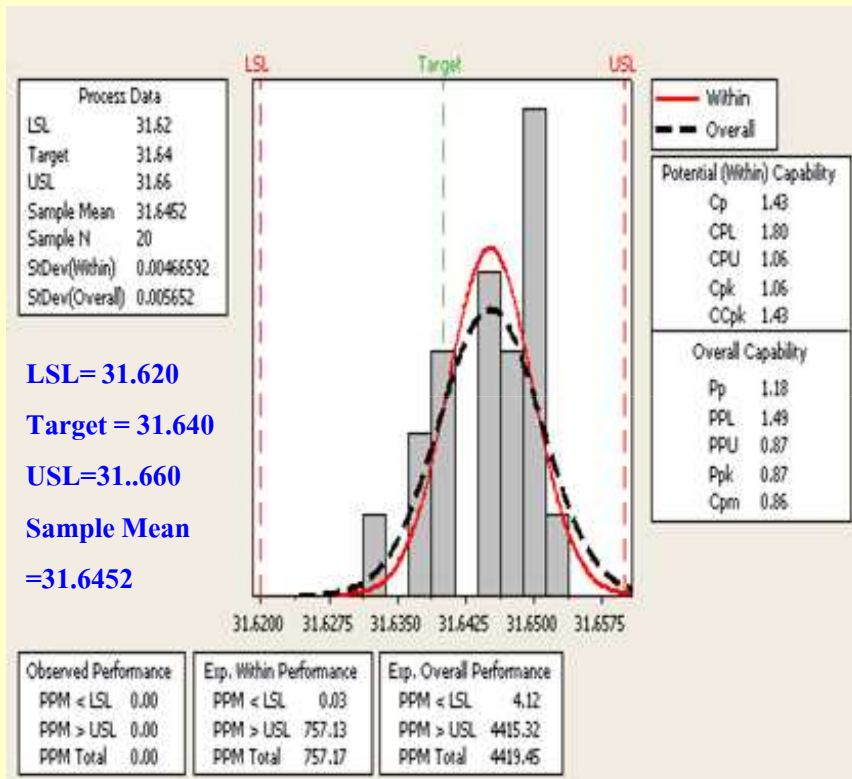
AMAS Project (LRP)

LRP (Loss Reduction Process) is
the activity to reduce loss in the
process

AMAS Project (LRP)



PH Before



Potential(Within)Capability

Cp = 1.43

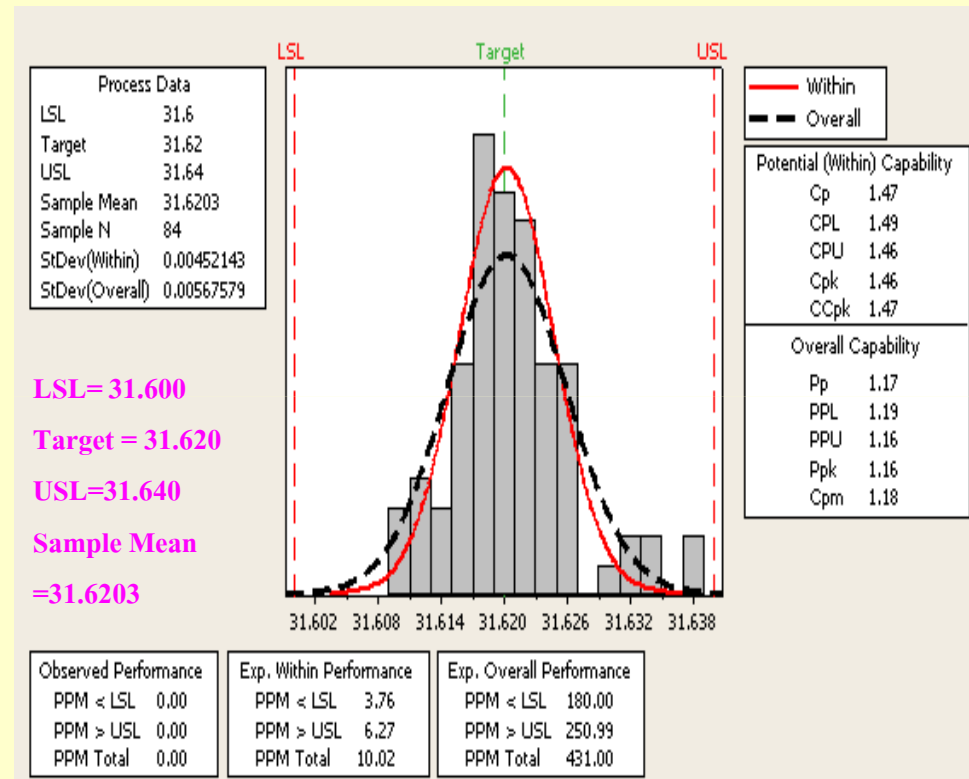
Cpk = 1.06

Overall Capability

Pp = 1.18

Ppk= 0.87

PH After



LSL= 31.600

Target = 31.620

USL=31.640

Sample Mean

=31.6203

Potential(Within)Capability

Cp = 1.47

Cpk = 1.46

Overall Capability

Pp = 1.17

Ppk= 1.16

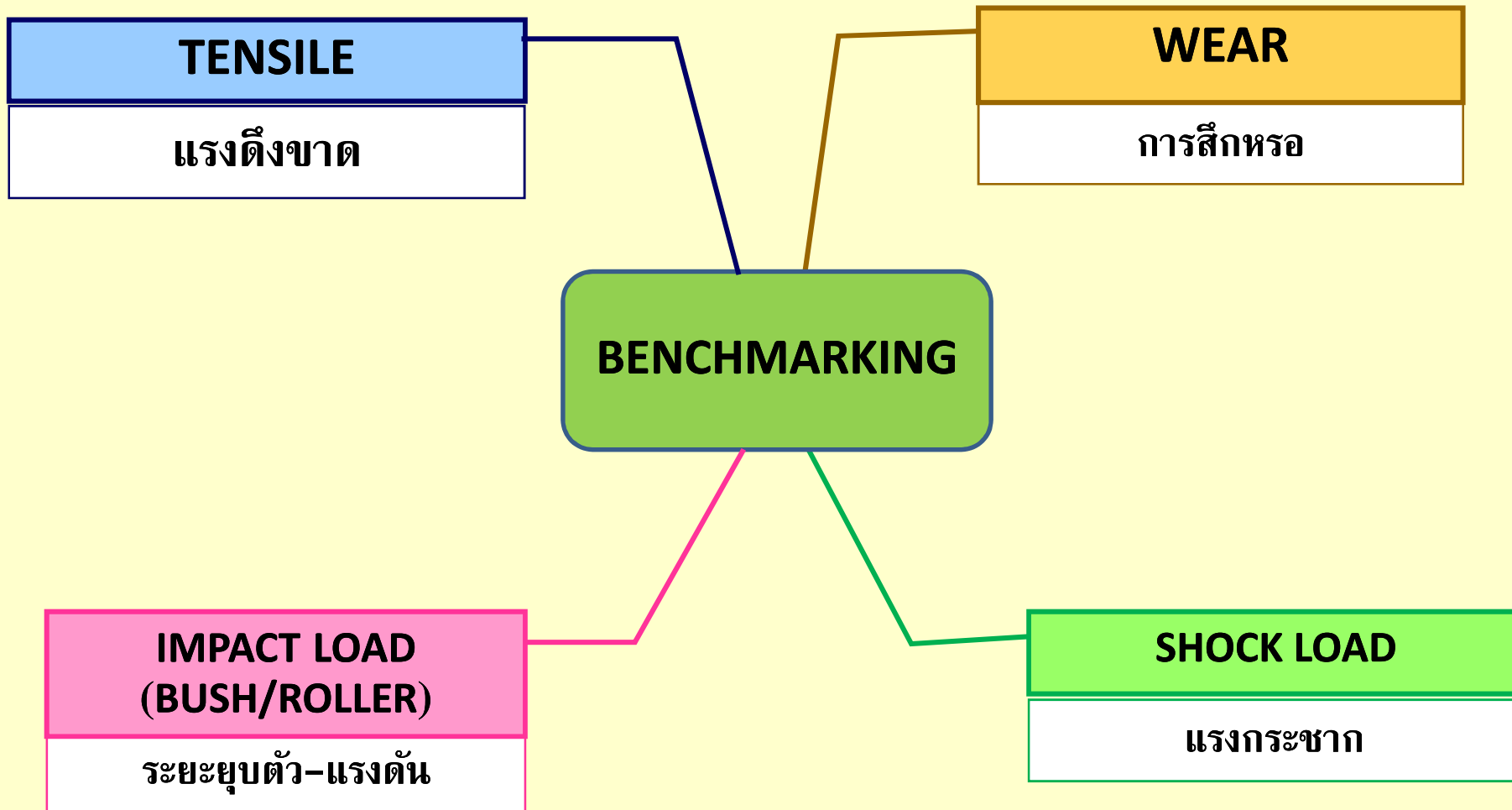


Research and Development for high quality materials selection suitable for production of excellent chain with high tensile strength, high resistant to shock load, high wear resistant.

Inspection processes for hardening parts with high precision and in-house built equipment.



Compare with Competitor



การเปรียบเทียบผลทดสอบการป่นโซ่ 428H A,SK,D และ 520 Solid Bush

ความยาว : 126 ข้อ

ความเร็วรอบ : 1400 RPM

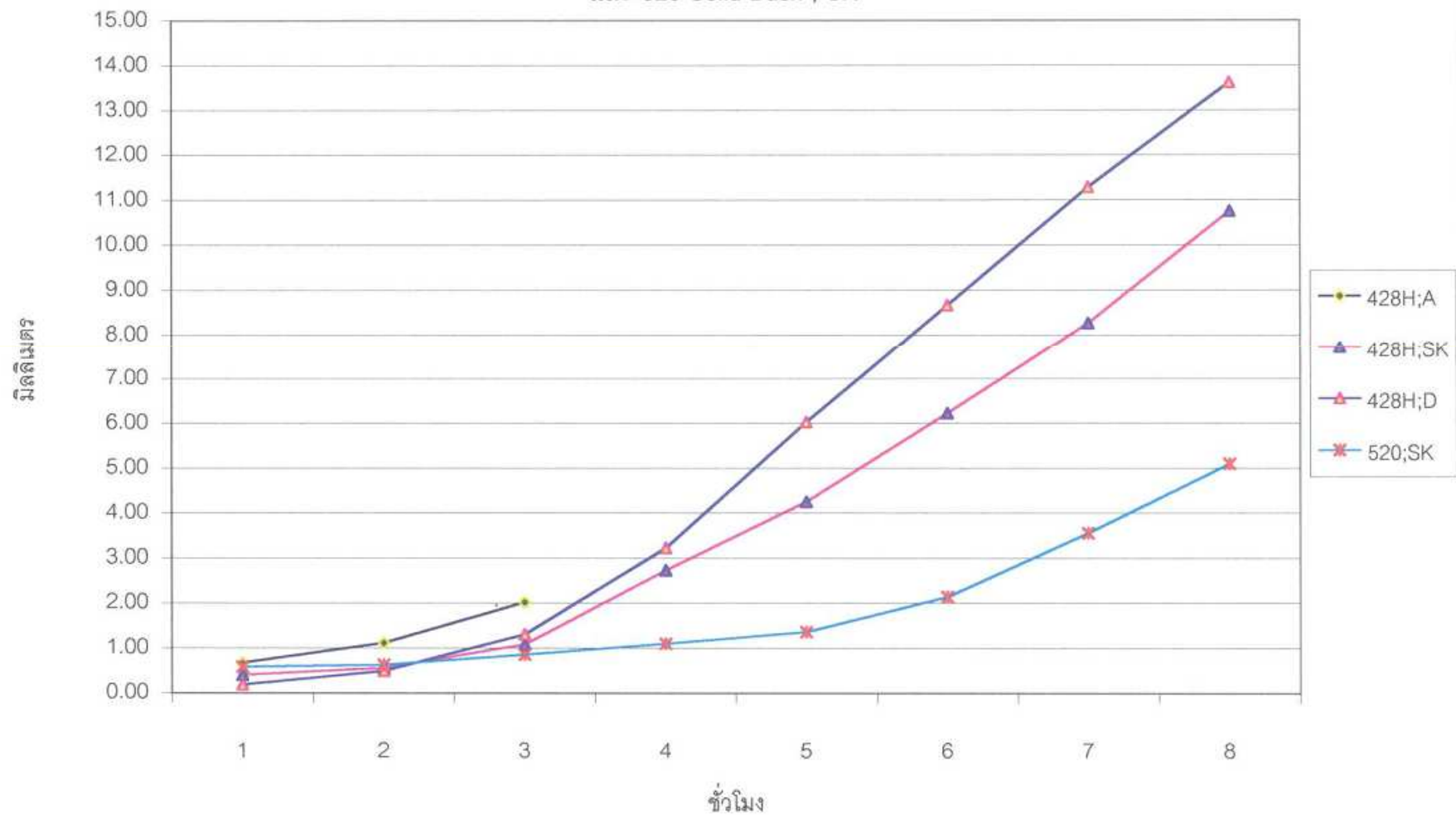
มอเตอร์ : 2 HP

อัตราทด : 2.714 : 1

ชั่วโมง	ระยะยึดสะสม(มิลลิเมตร)			
	428H			520 Solid Bush
	A	SK	D	SK
0	0.00	0.00	0.00	0
1	0.68	0.41	0.19	0.59
2	1.12	0.56	0.50	0.63
3	2.02	1.08	1.31	0.86
4		2.73	3.22	1.1
5		4.25	6.03	1.36
6		6.23	8.67	2.14
7		8.27	11.30	3.56
8		10.76	13.62	5.1

หมายเหตุ โซ่ 428H มาร์ค A ข้อแข็งตั้งแต่ชั่วโมงที่ 4 หยุดการทดสอบ

กราฟแสดงความสัมพันธ์ระหว่างระยะยึดสะสมและเวลาการปั่นโช้ 428H ; A,SK,D
และ 520 Solid Bush ; SK



SHOCK LOAD

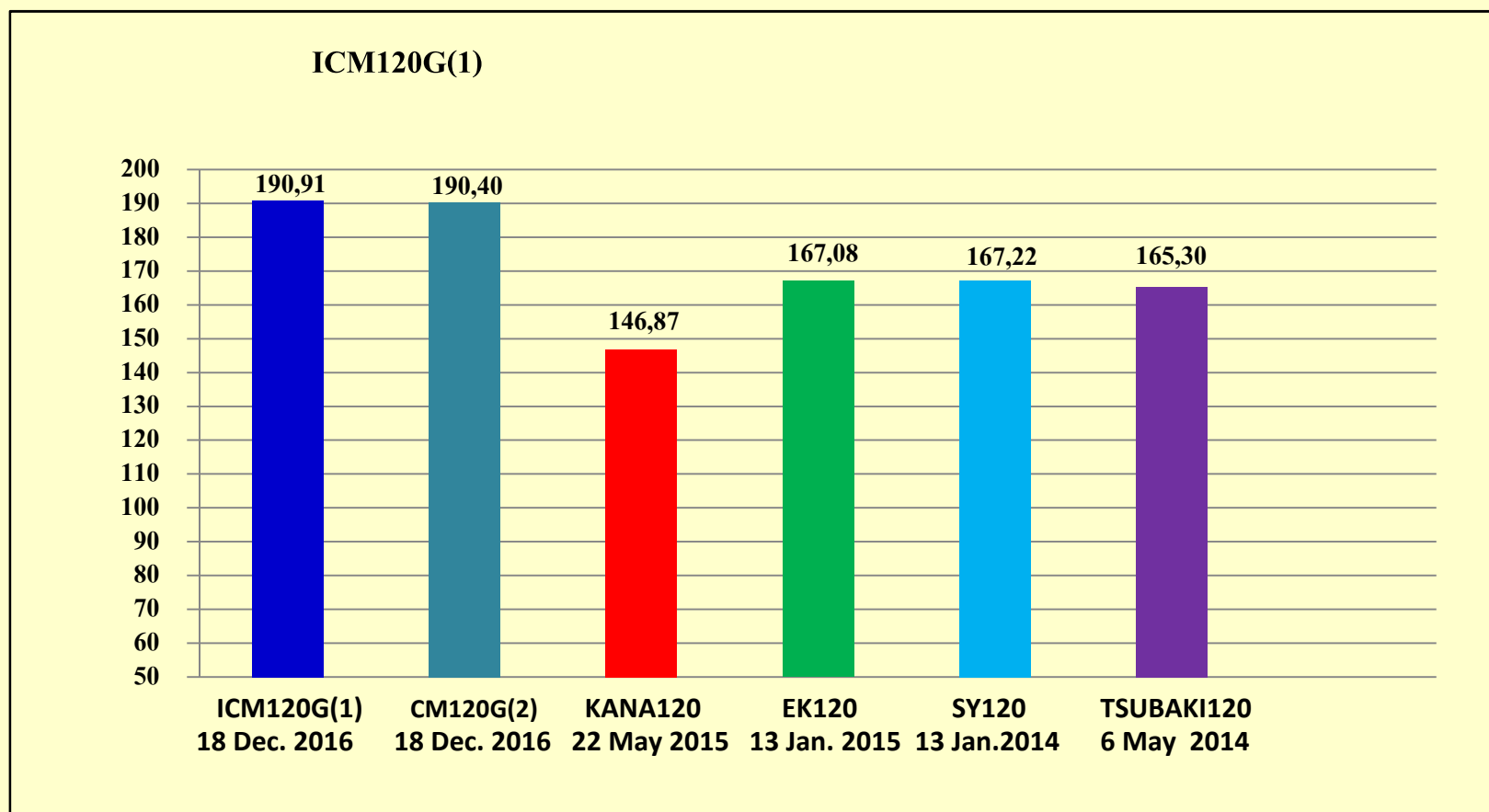
แรงกระชาก



Item	IMPACT	Status
PIN ICM	266	unbroken
	254	broken
PIN of other company	162	broken
	76	broken



TENSILE STRENGTH (kN.)						
NO	ICM120G(1)	ICM120G(2)	KANA120	EK120	SY120	TSUBAKI120
1	190.91	190.40	146.87	167.08	167.22	165.30
BREAKAGE	PIN	PIN	PIN	PH	PIN	PIN
	SLIP	SLIP	BROKEN	BROKEN	SLIP	SLIP



One Page Summary

587ทำงานให้ไ้ได้มากเงินในเวลาที่น้อยลง...
ความลับที่รู้กันเฉพาะในกลุ่มพนักงานโตโยต้า!

เทคนิค
สรุปทุกอย่าง
ลงใน
「กระดาษ
แผ่นเดียว」
ที่ฉันเรียนรู้มาจาก
โตโยต้า

トヨタで学んだ「紙1枚!」にまとめる技術
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