Jurnal Serambi Engineering JSE
Volume XI, No.1, Januari 2026 Hal 16710 - 16721
p-ISSN : 2528-3561
e-ISSN : 2541-1934

Review of Problem Tooling Breakdown Fixes at the Op10 Part Panel Anniversary, RR W/House Inn, RR L/R (RH) at PT. Summit Adyawinsa Indonesia

Elika Tiara Wijaya*, Dene Herwanto, Naufal Rabbani Sumitra

Industrial Engineering Department, Universitas Singaperbangsa Karawang, Jawa Barat
***Corresponding author**: elikaelika2@gmail.com

Received: November 25, 2025 Approved: December 6, 2025

Abstract
Anniversary damage in the stamping process is a critical problem that can affect product quality and hinder smooth production in the automotive industry. This study aims to identify the main cause of damage to the OP10 Anniversary of the RR W/House Inn RR L/R (RH) at PT. Adyawinsa Indonesia Summit and formulate the right improvement steps to reduce the frequency of breakdowns. The research uses a case study approach through direct observation, structured interviews with Maintenance Tooling personnel, as well as analysis of OEE data and damage history for the period June–December 2024. The data were analyzed using the Root Cause Analysis method (Fishbone Diagram and 5 Why) as well as technical evaluation on the insert dies component. The results showed that scratch defects in parts were caused by damage to the blank holder insert in the form of pin holes and peeling hardchrome layers, which was exacerbated by less effective preventive maintenance and technical inspections that were only visual. This condition caused 39 breakdown events with a total downtime of 41 hours. Repair recommendations are carried out through insert redesign, precision machining, hardening process, re-hard chrome, and improvement of inspection flow and tooling monitoring. In conclusion, improving the quality of inserts and strengthening the preventive maintenance system has been proven to be able to reduce the potential for repeated damage and increase the reliability of the stamping process.
Keywords: *dies stamping, tooling breakdown, preventive maintenance, fishbone diagram, 5why analysis*

Abstrak
Kerusakan dies pada proses stamping merupakan permasalahan kritis yang dapat memengaruhi kualitas produk dan menghambat kelancaran produksi di industri otomotif. Penelitian ini bertujuan mengidentifikasi penyebab utama kerusakan Dies OP10 Part Panel RR W/House Inn RR L/R (RH) di PT. Summit Adyawinsa Indonesia serta merumuskan langkah perbaikan yang tepat untuk menurunkan frekuensi breakdown. Penelitian menggunakan pendekatan studi kasus melalui observasi langsung, wawancara terstruktur dengan personel Maintenance Tooling, serta analisis data OEE dan histori kerusakan periode Juni–Desember 2024. Data dianalisis menggunakan metode *Root Cause Analysis* (Fishbone Diagram dan analisis 5 Why) serta evaluasi teknis pada komponen insert dies. Hasil penelitian menunjukkan bahwa cacat *scratch* pada part disebabkan oleh kerusakan insert blank holder berupa pin hole dan lapisan hardchrome yang mengelupas, yang diperparah oleh pelaksanaan preventive maintenance yang kurang efektif dan inspeksi teknis yang hanya bersifat visual. Kondisi ini menyebabkan 39 kejadian *breakdown* dengan total *downtime* 41 hours. Rekomendasi perbaikan dilakukan melalui redesign insert, machining presisi, proses hardening, re-hardchrome, serta perbaikan alur inspeksi dan monitoring tooling. Kesimpulannya, peningkatan kualitas insert dan penguatan sistem preventive maintenance terbukti mampu menurunkan potensi kerusakan berulang dan meningkatkan keandalan proses stamping.
Kata Kunci: *dies stamping, tooling breakdown, perawatan pencegahan, diagram fishbone, analisis 5why*

1. Introduction

The automotive industry in Indonesia faces major challenges in maintaining the quality, stability of the production process, and the reliability of the engine, especially in the stamping process which is highly dependent on the condition of the anes [1]. PT. Summit Adyawinsa Indonesia as a joint venture company that produces various automotive components for major customers such as PT. Suzuki Indomobil Motor and PT. Honda Prospect Motor, carries out stamping, welding, and assembling processes that demand tooling accuracy and durability [2]. One of the problems that often arise is tooling breakdowns that cause increased production downtime, high maintenance costs, and the risk of declining the quality of the final

product [3]. Damage to the OP10 Anniversary used to produce Panel Parts, Rr W/House Inn, Rr L/R (Rh) is a serious concern because it has a direct impact on smooth operation and the achievement of production targets [4]. Various factors such as material wear, mis-setting of machine parameters, and suboptimal design can trigger repeated damages, so a thorough evaluation of the repair processes and activities that have been carried out so far requires a thorough evaluation of the repair processes and activities that have been carried out [5].

Previous research related to machine maintenance systems generally focuses on the application of preventive, predictive, and breakdown maintenance to improve the reliability of the production process [6]. However, most of these studies are general and have not examined the specific characteristics of damage to certain dies in the stamping process, especially in the case of the production of automotive components with a high level of precision [7]. In addition, previous research has not elaborated on the causes of damage in detail based on actual data in the field or the pattern of damage in one particular type of anniversary [8]. This shows the need for more focused, in-depth, and real-world case-based analysis in the industry [9]. The novelty of this research lies in an analytical approach that is specifically focused on the OP10 Anniversary, so that the recommendations produced are more applicable, according to the company's operational context, and support continuous improvement efforts [10].

Based on these conditions, this study aims to review the causes of tooling breakdown in Dies OP10 Part Panel, Rr W/House Inn, Rr L/R (Rh) at PT. Adyawinsa Indonesia Summit, as well as providing concrete improvement recommendations to increase the effectiveness of the maintenance system and reduce the frequency of damage to the dies. The results of the research are expected to contribute to improving the reliability of production equipment, reducing downtime, and increasing company productivity. Thus, this research brings direct benefits to the development of a more effective maintenance strategy that can be applied to the national automotive industry environment.

2. Material and Methods

This study uses a descriptive research design with a case study approach that is carried out directly in the process of improving the anniversary at PT. Adyawinsa Indonesia Summit. This design was chosen because the research focuses on an in-depth observation of the actual condition, damage patterns, and repair process of the OP10 Part Panel, Rr W/House Inn, Rr L/R (Rh). The research data was obtained from primary and secondary data sources [11]. Primary data was collected through field observations in the Maintenance Tooling department, structured interviews with field supervisors and technical personnel involved in the repair process, as well as documentation of the repair process carried out by the company [12]. The primary data includes data on die damage, breakdown frequency, engine downtime, product defect patterns, and repair steps implemented [13]. Meanwhile, secondary data is obtained from internal company documents such as OEE records, maintenance reports, anniversary repair schedules, as well as references related to machine maintenance procedures and applicable technical standards [14].

The type of data used in this study consists of qualitative and quantitative data. Qualitative data is in the form of an explanation of the repair process, visual conditions of the dies, and the factors causing the damage, while quantitative data includes the length of the breakdown, the number of damage incidents, and the results of tests after repair [15]. The data collection technique was carried out by direct observation method to see the physical condition of the anniversary and document repair steps, interviews to obtain in-depth information related to the cause of damage, and document review to review the history of damage and maintenance [16]. All data obtained were analyzed in a structured manner using the Root Cause Analysis (RCA) method, which includes the Fishbone Diagram and 5 Whys analysis, to identify the root cause of the dies damage [17]. In addition, trend analysis was carried out on breakdown data during the period from June to November 2024 to see recurring patterns that affect the effectiveness of the production process [18]. The results of the analysis are used as a basis for formulating recommendations for technical improvements and more effective maintenance strategies for the company. To provide a comprehensive overview of the research steps carried out, the flow of the research process is presented in the following flowchart in **Figure 1**.

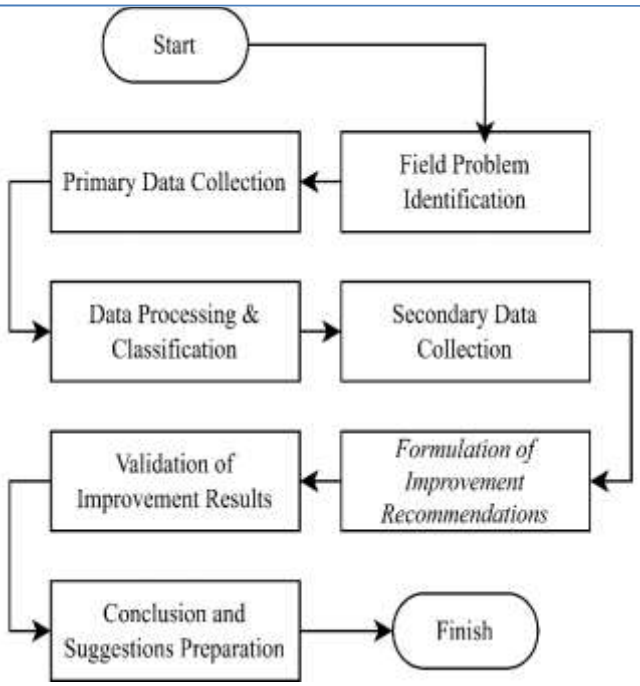

Fig. 1: Research Flow Flowchart
Source: Author's Processing Results, 2025

3. Results and Discussion

Problem Data

Data yang diperlukan dalam penelitian ini diperoleh melalui wawancara dengan pembimbing field and Repair Leader of the Maintenance Department of PT. Adyawinsa Indonesia Summit. Information on the problem of the OP10 Part Panel RR W/House Inner L/R (Rh) is sourced from OEE records for the June-November 2024 period, which contains the breakdown time, type of problem, root cause, temporary actions, and corrective actions that have been implemented.

Based on this data, the most frequent damage is the condition of rough dies which causes scratch defects in the part. This problem recurs almost every month and requires actions such as polishing dies, resetting stoppers, repairs to the engine, and several applications of hardchrome on the upper and lower dies. Several additional problems were also found, such as interference with the cushion pins, unstable cushion pressure, leaking wind pipes, and trim line mismatches.

Overall, in the period from June to November 2024, 39 repairs were recorded with a total downtime of 41 hours. This condition causes the KPI not to be achieved and shows that the corrective actions taken are still temporary and have not solved the actual source of the problem. Therefore, more thorough follow-up measures are needed to prevent repeated breakdowns and avoid wasting time and production costs. The data can be seen in **Table 1 - Table 6**.

Table 1. Data OEE June

Date	Part Name	Name Of Process	Die Breakdown (hours)	Problem	Root Cause	Temporary Action	Fixed Action
03/06/2024	PANEL,RR W/HSE INR FR LH/RH	Draw	0,91	Problem T/L+ scratch [repair in MC]	The attraction of the part is not the same		Seting ulang stoper
13/06/2024	PANEL,RR W/HSE INR FR LH/RH	Draw	0,25	Die OP10 can't be out	Pin cushion nongol , Cylinder cushion there is a rust		A2-1 engine cushion cylinder repair

Source: Author's Processing Results, 2025

Table 2. Data OEE July

Date	Part Name	Name of Process	Die Breakdown (hours)	Problem	Root Cause	Temporary Action	Fixed Action
15/07/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0.50	Part Blisters	Rough Dies	Die Polishing	–
16/07/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0.75	Part Blisters	Part scratch and rough OP10 die	Repair request to tooling team	Die polishing 5 times; die disassembly for next schedule
17/07/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	1.08	Part Blisters	Part Scratch	Repair request to tooling team	–
18/07/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0.75	Repair by MTC	Part Blisters	Polishing using sandpaper	–
19/07/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	2.58	Die Blisters and stopper setting issue (T/L risk)	Part Blisters	Rough Dies	Die polishing at MTC
22/07/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0.50	Die change / Die breakdown	OP10 die still at tooling area, limited adaptor, rough upper and lower die	Hardchrome upper & lower die	–
23/07/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	1.66	Repair at MTC	Part blisters and rough upper–lower die	Polishing and hardchrome request for OP10 die	–
24/07/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	1.00	Part Scratch	Rough OP10 upper/lower die, part scratch, trim line minus	Polishing request to tooling team and standby on machine A2-1	Hardchrome die
25/07/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	1.41	Rough die causing blisters; MC water and clutch air pipe issue	Part Blisters	Die Polishing	–
26/07/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0.50	Repair at MTC	Part Blisters	Die Polishing	–
27/07/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	1.08	Repair at MTC	Part Blisters; T/L risk	Die polishing and stopper adjustment	–
30/07/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	2.92	Repair at MTC	Part Blisters	Polishing every 10 strokes on line	Die taken down for repair
31/07/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0.67	Repair at MTC	Part Blisters	Polishing every 50 strokes on line	–

Source: Author's Processing Results, 2025

Table 3. OEE August data

Date	Part Name	Name of Process	Die Breakdown (hours)	Problem	Root Cause	Temporary Action	Fixed Action
01/08/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0.25	Part blisters	Rough dies	Die polishing	—
02/08/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	3.82	Part blisters, machine repair not optimal, dies disassembled for repair	Rough dies	Die polishing	—
03/08/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	1.5	Part blisters	Rough dies	Die polishing	—

Jurnal Serambi Engineering JSE
Volume XI, No.1, Januari 2026 Hal 16710 - 16721
p-ISSN : 2528-3561
e-ISSN : 2541-1934

Date	Part Name	Name of Process	Die Breakdown (hours)	Problem	Root Cause	Temporary Action	Fixed Action
05/08/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	1.08	Part blisters	Rough dies	Die polishing	—
06/08/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0.5	Part blisters, dies polished on machine by tooling team	Rough dies	Die polishing	—
07/08/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0.66	Part blisters	Rough dies	Die polishing	—
08/08/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	1.08	Die breakdown	Upper & lower dies rough, scratch issue (16 times)	Requested die OP10 repair with die polishing	Hard chrome die
09/08/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	1.25	Die breakdown	Upper & lower dies rough, scratch issue	Requested die OP10 repair with die polishing	Hard chrome die
14/08/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0.75	Die breakdown	Upper & lower die OP10 rough / frequent scratch	Requested tooling team stand by & repair on machine	Hard chrome die
28/08/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0.25	Part wave	Unstable input cushion pressure	Pressure setting adjustment	—

Source: Author's Processing Results, 2025

Table 4. Data OEE September

Date	Part Name	Name of Process	Die Breakdown (hours)	Problem	Root Cause	Temporary Action	Fixed Action
01/08/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	00.25	Part Blisters	Rough Dies	Die Polishing	–
02/08/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0,181944	Part Blisters, insufficient repair on machine; die disassembled for repair	Rough Dies	Die Polishing	–
03/08/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	01.50	Part Blisters	Rough Dies	Die Polishing	–
05/08/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	01.08	Part Blisters	Rough Dies	Die Polishing	–
06/08/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	00.50	Part Blisters; die polished on machine by tooling team	Rough Dies	Die Polishing	–
07/08/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0,045833	Part Blisters	Rough Dies	Die Polishing	–
08/08/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	01.08	Die breakdown	Rough upper & lower die; 16 scratch defects	Polishing request for OP10 die	Hardchrome die

Source: Author's Processing Results, 2025

Table 5. Data OEE October

Date	Part Name	Name of Process	Die Breakdown (hours)	Problem	Root Cause	Temporary Action	Fixed Action
01/10/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0,052083	Part Blisters	Rough Dies	Die Polishing	–
03/10/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	00.33	Part Blisters	Rough die surface	Die repair on machine	–

Date	Part Name	Name of Process	Die Breakdown (hours)	Problem	Root Cause	Temporary Action	Fixed Action
08/10/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	00.25	Part Blisters	Rough Dies	Die Polishing	–
14/10/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0,051389	Part Blisters	Rough Dies	Die Polishing	–
16/10/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0,063194	Part Blisters	Rough Dies	Die Polishing	–
23/10/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	00.50	Part Blisters	Rough Dies	Die Polishing	–

Source: Author's Processing Results, 2025

Table 6. Data OEE November

Date	Part Name	Name of Process	Dies Breakdown (hours)	Problem	Root Cause	Temporary Action	Fixed Action
11/11/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	01.25	Part Blisters	Rough Dies	Die Polishing	–
12/11/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0,104861	Part Blisters	Rough Dies	Die Polishing	–
13/11/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	01.50	Part Blisters	Rough Dies	Die Polishing	–
15/11/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	00.33	Part Blisters	Rough Dies	Die Polishing	–
16/11/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	02.50	Part Blisters	Rough Dies	Die Polishing	–
19/11/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	00.41	Part Blisters	Rough Dies	Die Polishing	–
25/11/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0,057639	Part Blisters	Rough Dies	Die Polishing	–
28/11/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	01.25	Part Blisters	Rough Dies	Die Polishing	Hardchrome

Source: Author's Processing Results, 2025

Based on OEE monitoring in December, the problem of Blisters parts in the Draw process was found again for RR W/HSE INR FR LH/RH Panel parts. The main cause is the rough surface of the dies, so further repair measures are required. **Table 7** the following summarizes the OEE data after temporary fixes:

Table 7. Data OEE December

Date	Part Name	Name of Process	Dies Breakdown (hours)	Problem	Root Cause	Temporary Action	Fixed Action
02/12/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0,063194	Part Blisters	Rough Dies	Die Polishing	–
05/12/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	00.58	Part Blisters	Rough Dies	Die Polishing	–
10/12/2024	PANEL, RR W/HSE INR FR LH/RH	Draw	0,0875	Part Blisters	Rough Dies	Die Polishing	–

Source: Author's Processing Results, 2025

Identify Damage Factors

The company conducted a Root Cause Analysis (RCA) on the damage to the OP10 dies that caused scratch *part* defects. Based on field findings, damage occurred to the blank holder insert in the form of pin holes and a peeling layer of hardchrome. Initial solution: insert modification using steel material and recoating to prevent repeated damage.

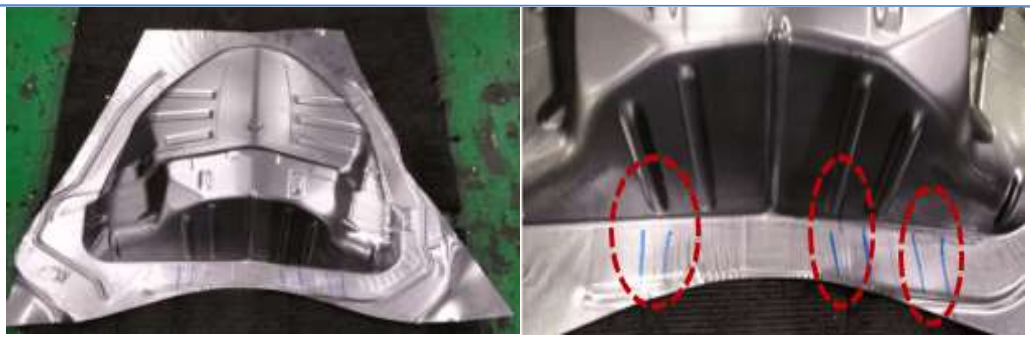

Fig. 2: Part Scratch
Source: Author's Processing Results, 2025

Corrective Maintenance Scheduling

The company conducted a Root Cause Analysis (RCA) on the damage to the OP10 dies that caused scratch *part* defects. Based on field findings, damage occurred to the blank holder insert in the form of pin holes and a peeling layer of hardchrome. Initial solution: insert modification using steel material.

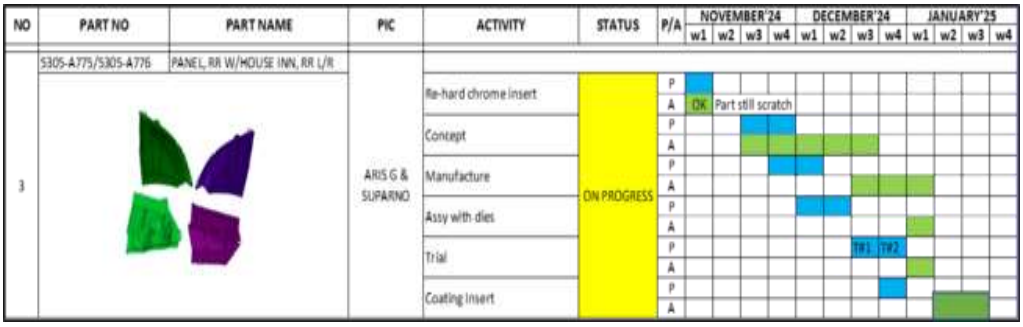

Fig. 3: OP10th Dies Repair Schedule
Source: Author's Processing Results, 2025

Technical Improvement Steps

a. Ordering Material

New insert materials are ordered as the initial stage of replacement of damaged components. This ensures that the material is ready to use before the repair process begins.

Fig. 4: Material
Source: Author's Processing Results, 2025

b. Scan Dies

The 3D scan process is carried out to obtain the shape and profile of the dies accurately. The scan results are the main reference in the redesign insert process.

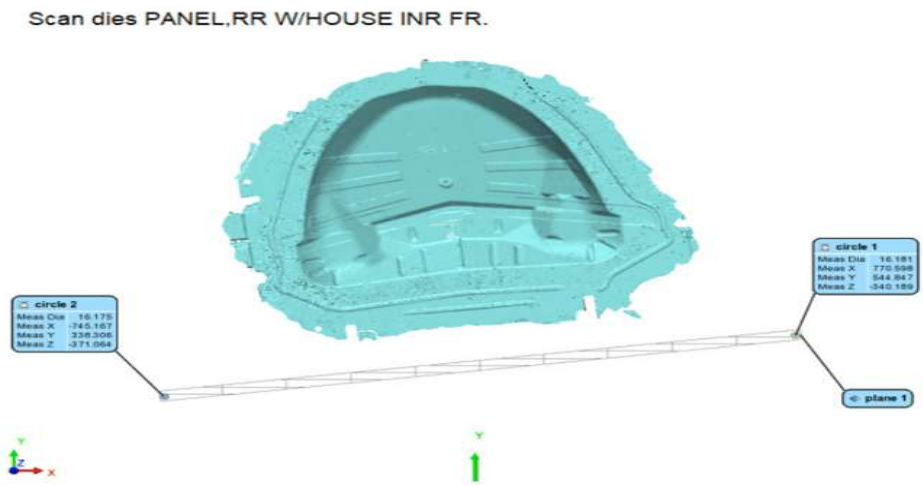

Fig. 5: Result Scan Dies OP10
Source: Author's Processing Results, 2025

c. Design (CAD)

The insert is then redesigned using CAD software based on the scanned data. This design at the same time improves the strength aspect and minimizes the potential of scratches.

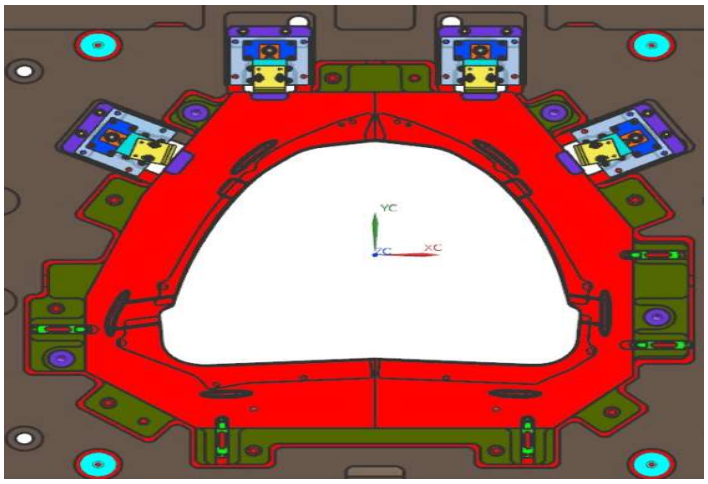

Fig. 6: Design Insert Dies OP10
Source: Author's Processing Results, 2025

d. Machining Insert dan Dies

The inserts and dies are machined using CNC machines to achieve precise shapes. This stage also includes minor adjustments to the dies to fit the new insert.

Fig. 7: Machining Insert dan Dies
Source: Author's Processing Results, 2025

Fig. 8: Dies
Source: Author's Processing Results, 2025

e. Haeden Insert

The finished insert is then formed through a hardening process (heat treatment). The goal is to make the insert stronger and not wear out quickly during the stamping process.

SUMMIT ADYAWINSA

PT. SUMMIT ADYAWINSA INDONESIA
DEPT. PE & TOOL MAINTENANCE
F1 - Repair Tooling Maintenance

PART LIST ORDER

Request By	Checked	Approved	Received
P. Agus	Adrian H	Gunawan E	M Saepul

NO.	ITEM NAME	SPECIFICATION Type	P	L	T	IMAGE	Act Weight (KG)	Qty	ESTIMASI PRICE PT. UMETOKU	ESTIMATED PRICE TOTAL PT. UMETOKU	REMARKS
1	#1 Jasa Harden Insert untuk item 5305A775/76	SKD11	150	90	40		4.2	1	Rp 30,000	Rp 128,000	
2	#2 Jasa Harden Insert untuk item 5305A775/76	SKD11	130	90	40				Rp 30,000	Rp 111,000	
3	#3 Jasa Harden Insert untuk item 5305A775/76	SKD11	130	90	40		3.7	1	Rp 30,000	Rp 111,000	
									TOTAL:	Rp 348,000	

Fig. 9: Harden's Submission List
Source: Author's Processing Results, 2025

f. Assembly, Spotting, Trial

The new insert is assembled into the dies and spotted to ensure surface suitability. After that, a stamping trial is carried out to check whether the part is free from scratch.

Fig. 10: Trial Process and Trial Results Part
Source: Author's Processing Results, 2025

g. Coating dan Re-hardchrome

The inserts that pass the trial are then recoated with hardchrome so that the surface is smooth and friction-resistant. This final stage aims to prevent similar damage from reappearing in the future.

Fig. 11: Chrome Coating and Re-hrd Process
Source: Author's Processing Results, 2025

Diagram Fishbone

Fishbone analysis was used to identify the causes of *scratches* in RR W/House Inn RR L/R Panel parts from the aspects of machinery, materials, methods, humans, environment, and measurements.

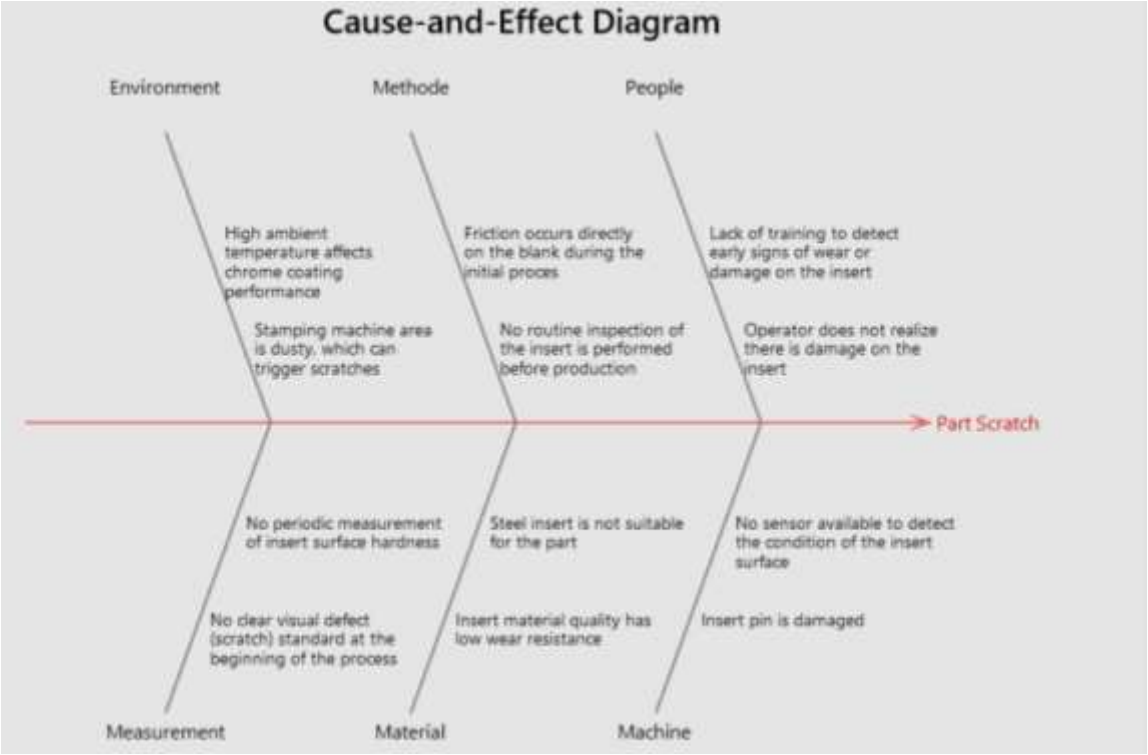

Fig. 12: Proses Coating dan Re-hrd Chrome
Source: Author's Processing Results, 2025

The results of the analysis showed that *scratch* was caused by worn inserts, damage to pin holes and hardchrome coatings, lack of routine inspections, suboptimal operator skills, less supportive working environment conditions, and no standard for measuring surface roughness. Therefore, improvements are directed at insert modifications, improvement of inspection SOPs, operator training, and strengthening of the tooling monitoring system.

Diagram Fishbone

The 5 Why analysis was used to trace the root cause of scratch defects in parts, based on the results of interviews with Section Head Dept. Maintenance Tooling.

Table 8. Data OEE December

No	Question	Explanation
1	Why are there scratches on the part?	Because the surface of the die (insert blank holder) causes scratches during the drawing process.
2	Why does the insert blank holder cause scratches?	Because there is damage on the insert surface, such as pinholes and damage to the hard chrome coating.
3	Why does the hard chrome coating on the insert get damaged?	Because the insert blank holder is worn out and re-coating or repair is not done in a timely manner.
4	Why wasn't the insert re-coated or repaired immediately?	Because there is no scheduled monitoring or routine preventive maintenance system for the insert die condition.
5	Why is there no optimal preventive maintenance system?	Preventive Maintenance implementation is ineffective. Inspections are done visually only, without thorough testing of the insert coating condition (e.g., small pinholes or micro-damage in chrome are not detected).

Source: Author's Processing Results, 2025

The results of the analysis showed that the scratches occurred because the blank holder insert surface was damaged (the pin holes and hardchrome coating peeled off), while repairs or re-coatings were not carried out in time due to the absence of scheduled monitoring. In addition, the Preventive Maintenance system has not run optimally because the inspection is only carried out visually without thorough detection of surface conditions. Overall, the root of the problem lies in the ineffectiveness of Preventive Maintenance, so that worn inserts remain used and eventually produce scratch defects in the product.

4. Conclusion

Based on the results of observations, interviews, and data analysis during the implementation of Field Work Practice, it can be concluded that the scratch defect problem on the OP10 Anniversary of the RR W/House Inn RR L/R (RH) is caused by damage to the blank holder insert in the form of pin holes and the degradation of the hardchrome layer that arises due to the non-optimal *preventive maintenance* system and weak technical inspection of the insert condition. The damage had a direct impact on the decline in product quality, increased downtime of up to 41 hours with 39 breakdown events, and the non-achievement of KPI targets during the observation period. Repair efforts are carried out through insert replacement, *re-hard chrome*, and *trial stamping* which are carried out in stages through *a structured corrective maintenance* approach from November 2024 to January 2025. To ensure the sustainability of the quality of the production process, it is recommended that companies optimize preventive maintenance systems, strengthen technical inspection procedures, improve operator competence, evaluate the quality of insert materials, and develop digital-based monitoring systems as a follow-up step that can prevent similar damage in the future.

5. Acknowledgment

The authors would like to express their sincere gratitude to PT. Summit Adyawinsa Indonesia for providing access to operational data, facilities, and technical support throughout the completion of this research. Appreciation is also extended to the Maintenance Tooling Department, especially the Section Head and Repair Team, for their valuable insights, interviews, and guidance during the field study and data collection process. The authors are equally grateful to Universitas Singaperbangsa Karawang for academic supervision and continuous support that contributed significantly to the successful completion of this work.

6. References

[1] A. Bani Syaher, M. Mukti, I. Ramadhan, and A. Z. Alfaritsy, "Pendekatan Lean Manufacturing Menggunakan Metode Value Stream Mapping (VSM) Pada Umkm Samikem Sablon," *Jurnal Ilmiah Penelitian Mahasiswa*, vol. 2, no. 4, pp. 423–432, 2024, doi: 10.61722/jipm.v2i4.303.

[2] K. Nadiyah, M. I. Senjawati, and G. R. Putri, "Perbaikan Sistem Kerja Proses Produksi Tahu pada PT XYZ menggunakan Peta-Peta Kerja," *JLSAT*, vol. VI, no. 1, pp. 26–30, 2024.

[3] N. Fithri Azizah, R. Agil Apriani, F. P. Mahardika, M. A. Zikra Zizo, F. Aji Pradana, and A. Azzam, "Analisis Perancangan Tata Letak Menggunakan Metode Activity Relationship Chart (ARC) dan Computerized Relationship Layout Planning (CORELAP) Pada CV. Tunas Karya," *Jurnal Teknik Industri*, vol. 9, no. 1, pp. 86–94, 2023.

[4] D. Mariboto *et al.*, "Perancangan Ulang Tata Letak Untuk Pengoptimalisasian Ruang Pada Toko Ritel RDSP Bogor," *Jurnal Teknologi dan Manajemen Industri Terapan (JTMIT)*, vol. 2, no. 2, pp. 135–143, 2023.

[5] N. N. Suwandi and K. Suhada, "Penerapan Lean Manufacturing dengan Metode Value Stream Mapping untuk Mengurangi Cycle Time pada Bagian Perakitan Spring Mattress di PT X," *Journal of Integrated System*, vol. 7, no. 2, pp. 111–133, Jan. 2025, doi: 10.28932/jis.v7i2.8694.

[6] A. F. Sasono, V. Yunior Ismail, H. R. Asworo, A. Budiman, and D. Dhivari, "Pengaplikasian OMH, FTC, ARC, ATBD, ARD, dan AADDalam Perencanaan Tata Letak Fasilitas Pada PT.XYZDengan Menggunakan Software WinQSB," *Journal of Industrial and Engineering System*, vol. 5, no. 1, pp. 42–49, 2024.

[7] G. S. Rasikhak, K. Putri Kurnia, N. H. Istiqomah, C. A. Puteri, and N. Lestari, "Analisis Perancangan Ulang Tata Letak Fasilitas UD. Osha Snack Menggunakan Metode ARC dan TCR," *Indonesian Research Journal on Education*, vol. 4, no. 4, pp. 2073–2079, 2024.

[8] E. Sulistyowati and M. Munawaroh, "Integrating Value Stream Mapping, Waste Assessment Model, and Root Cause Analysis to Improve Loading–Unloading Efficiency at PT XYZ," *Jurnal Teknik Industri Terintegrasi*, vol. 8, no. 3, pp. 3599–3604, Jul. 2025, doi: 10.31004/jutin.v8i3.49182.

[9] S. Meutia, Fatimah, and N. Tumangger, "Analisis Gerakan Dan Pengukuran Waktu Kerja Untuk Mengurangi Pemborosan Gerakan Dengan Metode MOST (Maynard Operation Sequence Technique)," *Jurnal Industri Samudra*, vol. 4, no. 2, pp. 1–11, 2023.

[10] I. Bagus Suryaningrat and B. Herry Purnomo, "Penerapan value stream mapping untuk peningkatan produktivitas produksi okra beku di PT. MDT," *Jurnal Teknologi Industri Pertanian*, vol. 16, no. 4, pp. 599–610, Dec. 2023, doi: 10.21107/agrointek.v16i4.12110.

[11] F. Fahlevi, E. Amrina, B. Ibramgara, and Y. Savitri, "Penerapan Lean Manufacturing menggunakan Metode VSM dan 5S pada UMKM di Kota Padang," *Jurnal Sains dan Teknologi: Jurnal Keilmuan dan Aplikasi Teknologi Industri*, vol. 25, no. 1, pp. 28–43, Jun. 2025, doi: 10.36275/ny28qw84.

[12] S. A. Nuraini and S. Dewi, "Perancangan tata letak workshop menggunakan metode Systematic Layout Planning (SLP) di pergudangan Central Industrial Park," *Jurnal Teknik Industri Terintegrasi*, vol. 8, no. 1, pp. 736–744, Jan. 2025, doi: 10.31004/jutin.v8i1.40280.

[13] P. Anggela, A. Y. M. Nababan, and I. Sujana, "Perancangan Ulang Tata Letak Fasilitas Dengan Metode Systematic Layout Planning Pada PT Tri Mandiri Sejati," *Jati Unik : Jurnal Ilmiah Teknik dan Manajemen Industri*, vol. 7, no. 1, Oct. 2023, doi: 10.30737/jatiunik.v7i1.3582.

[14] Z. Khaerul Fajri, "Perancangan Sistem Kerja Pada Area Produksi Strainer 4W di PT Assyifa Teknik Mandiri," *Jurnal Pengabdian Masyarakat*, vol. 4, no. 2, pp. 70–76, 2025, doi: 10.61193/jpme.v4i2.74.

[15] V. Nadia, E. Retnaningtyas, F. Valentino, and R. Wahyudi, "Usulan Perbaikan dan Standarisasi Sistem Kerja pada Proses Produksi Baja Ringan Jenis Reng di PT. Pratama Mandiri Paksi," *Jurnal Sustainability, Ergonomics, Optimization, and Application of Industrial Engineering*, vol. 1, no. 2, pp. 76–85, 2024.

[16] F. Maulana Fajri, "Usulan Perbaikan Tata Letak Produksi Meja Lipat Menggunakan Metode Blocplan," *Jurnal Syntax Admiration*, vol. 3, no. 3, pp. 529–545, Mar. 2022, doi: 10.46799/jsa.v3i3.403.

[17] A. Bani Syaher, M. Mukti, Ramadhan Irfan, and A. Z. Alfaritsy, "Pendekatan Lean Manufacturing Menggunakan Metode Value Stream Mapping (VSM) pada UMKM Samikem Sablon," *Jurnal Ilmiah Penelitian Mahasiswa*, vol. 2, no. 4, pp. 423–432, 2024, doi: 10.61722/jipm.v2i4.303.

[18] V. Nadia, E. Retnaningtyas, F. Valentino, and R. Wahyudi, "Usulan Perbaikan dan Standarisasi Sistem Kerja pada Proses Produksi Baja Ringan Jenis Reng di PT. Pratama Mandiri Paksi," *Jurnal Sustainability, Ergonomics, Optimization, and Application of Industrial Engineering*, vol. 1, no. 2, pp. 76–85, 2024.