Background

TMMT has been working with FEKA AUTOMOTIVE as its supplier of mirror covers. The mirror covers are made of Acrylonitrile Butadiene Styrene (ABS) and injection molding process is applied in the phase of production. Manufactured parts are painted in the Plastic Shop and are then oven cured at 80^{o}C for 20 minutes according to standart procedure.

Background

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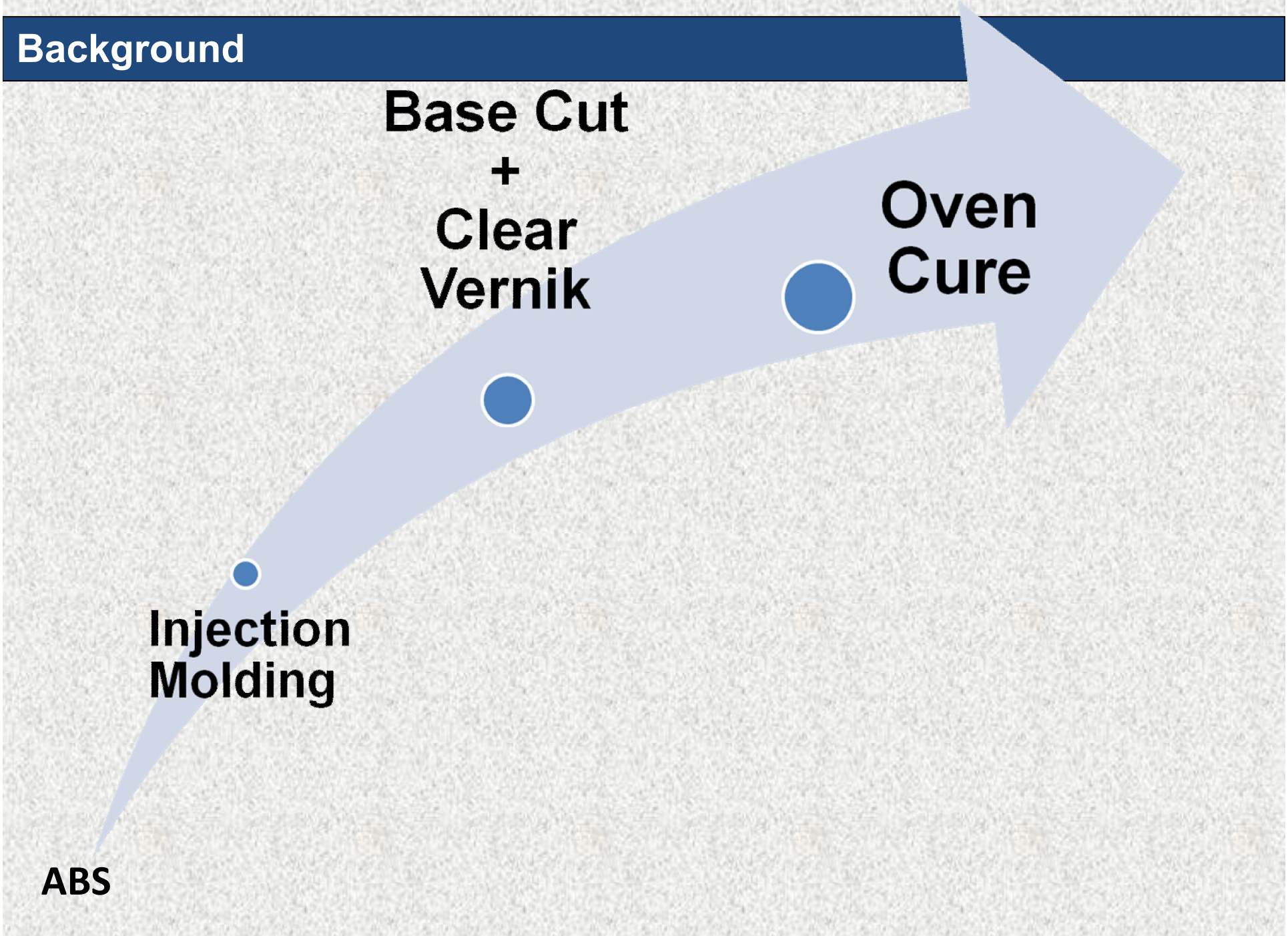
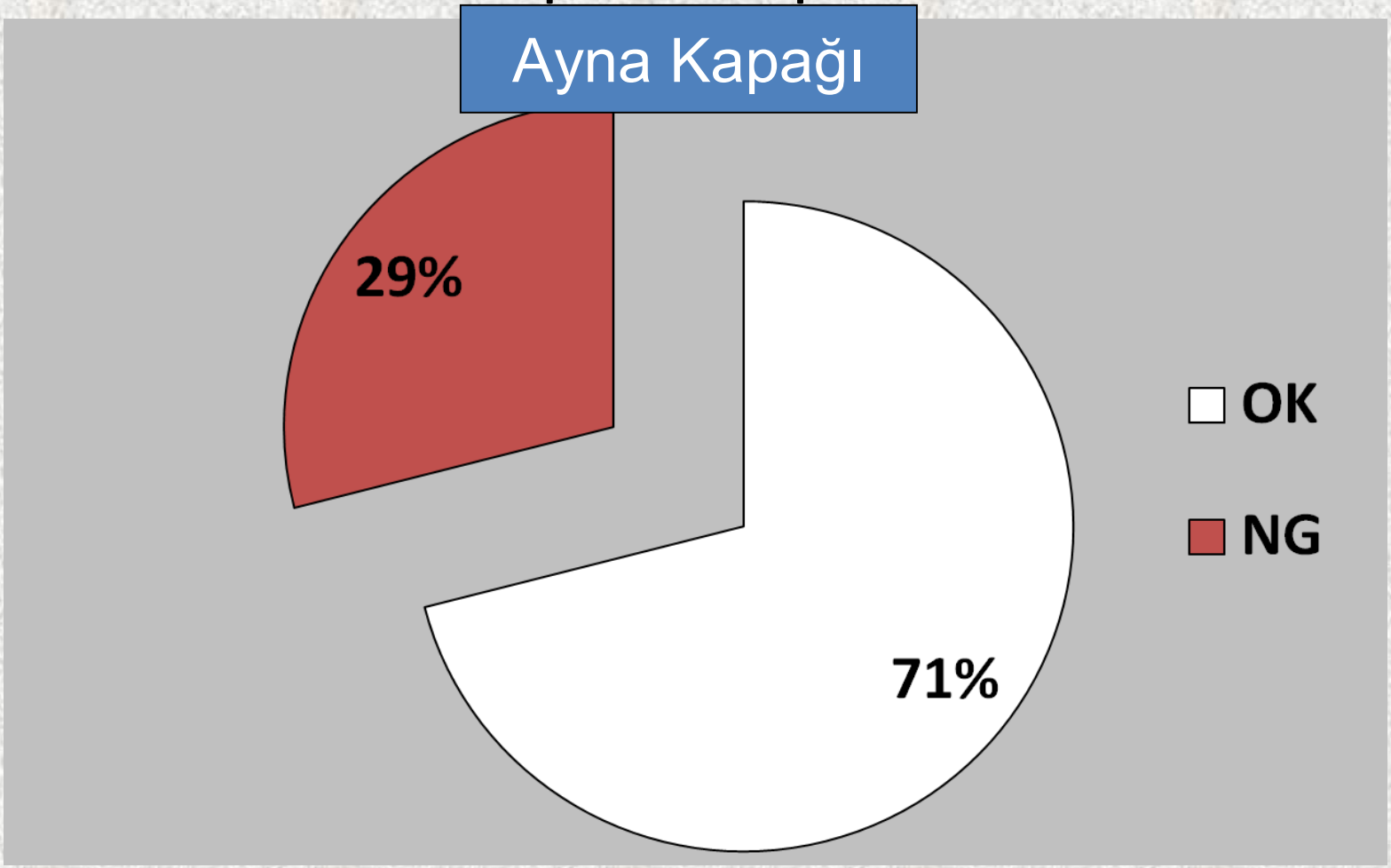


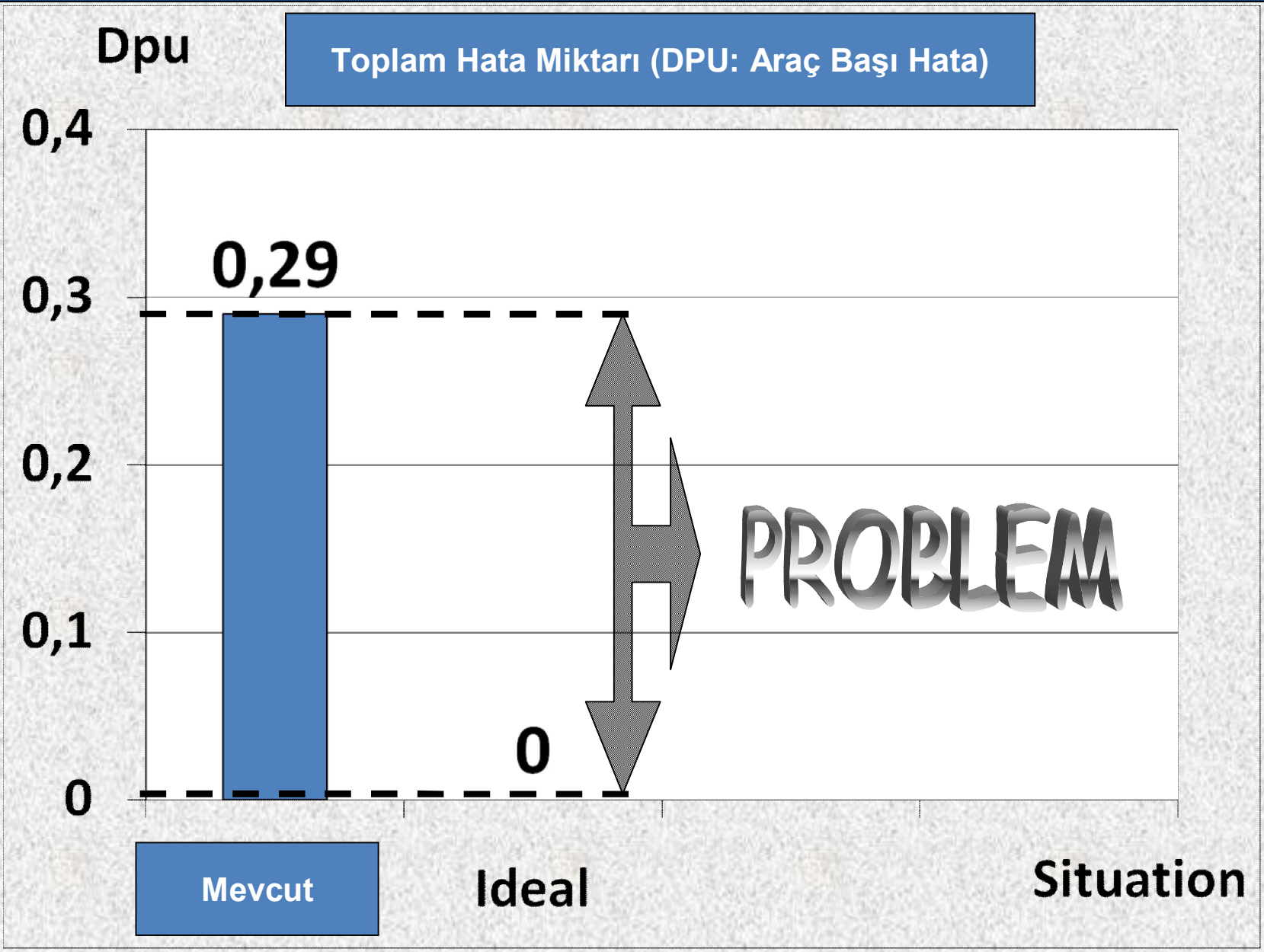
1. Problemin Tanımı

The production process has been interrupted many times over the past months due to a surface defect problem on painted mirror covers.



Üretilen ayna kapaklarının 29%'u kalite kontrolden geçemiyor. Ve montaj hattına gönderilemiyor

1. Clarification of the Problem



1. Clarification of the Problem

Hedef

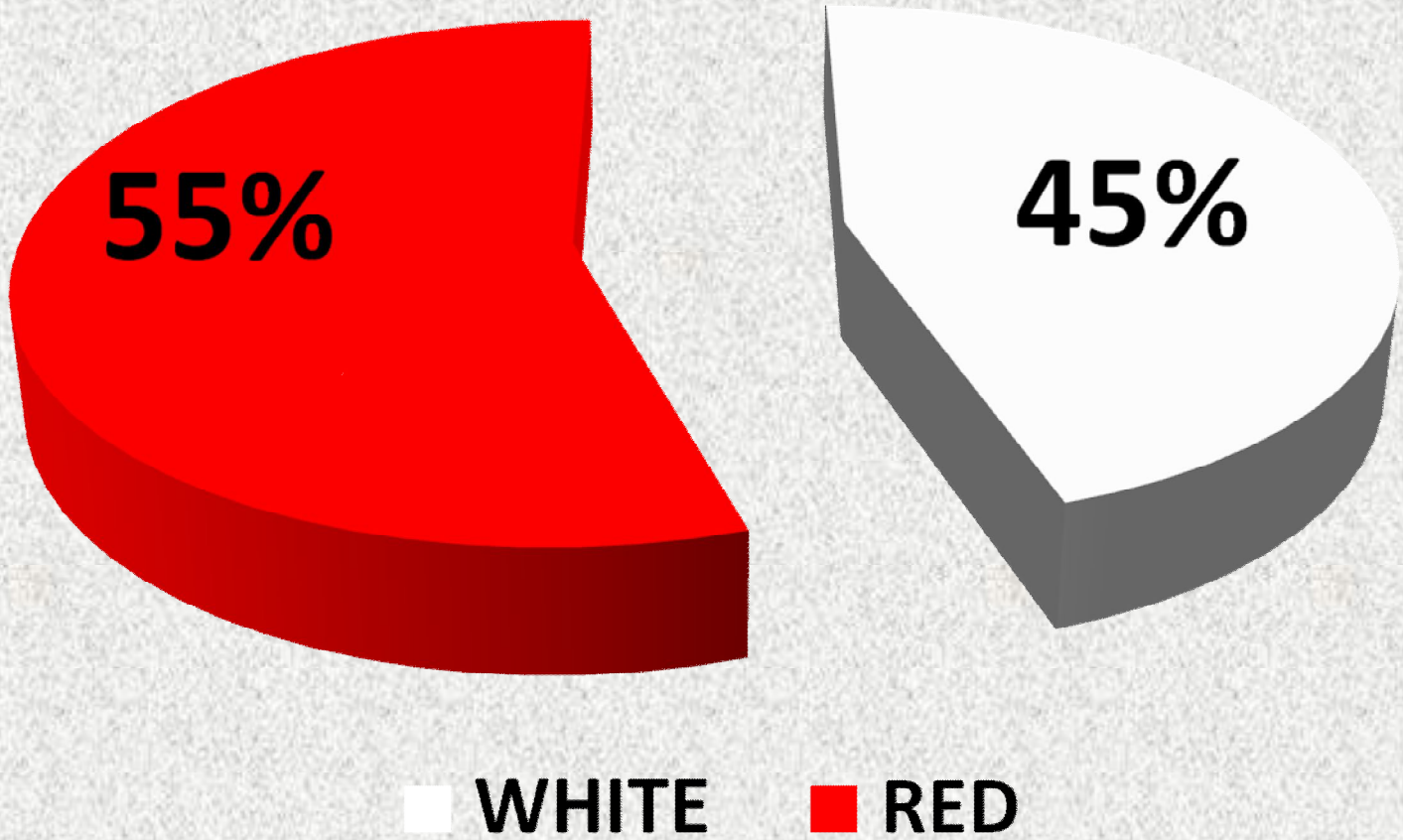
Manufacturing high quality cars with minimum cost

THE CONSEQUENCES of THE PROBLEM and THEIR EFFECTS

Sorun	Etkisi
Yetersiz Kalite	Düşük kalite dolayısı ile üretimin durması
Sürekli olarak geçici çözüm arayışları	Zaman ve kaynak israfı → Maliyet
Geçici çözümler için standart dışı uygulamalar	İş güvenliği sorunları
Çalışanlarda motivasyon düşüklüğü	Kaza riski, zayıf performans

2. Breakdown the Problem

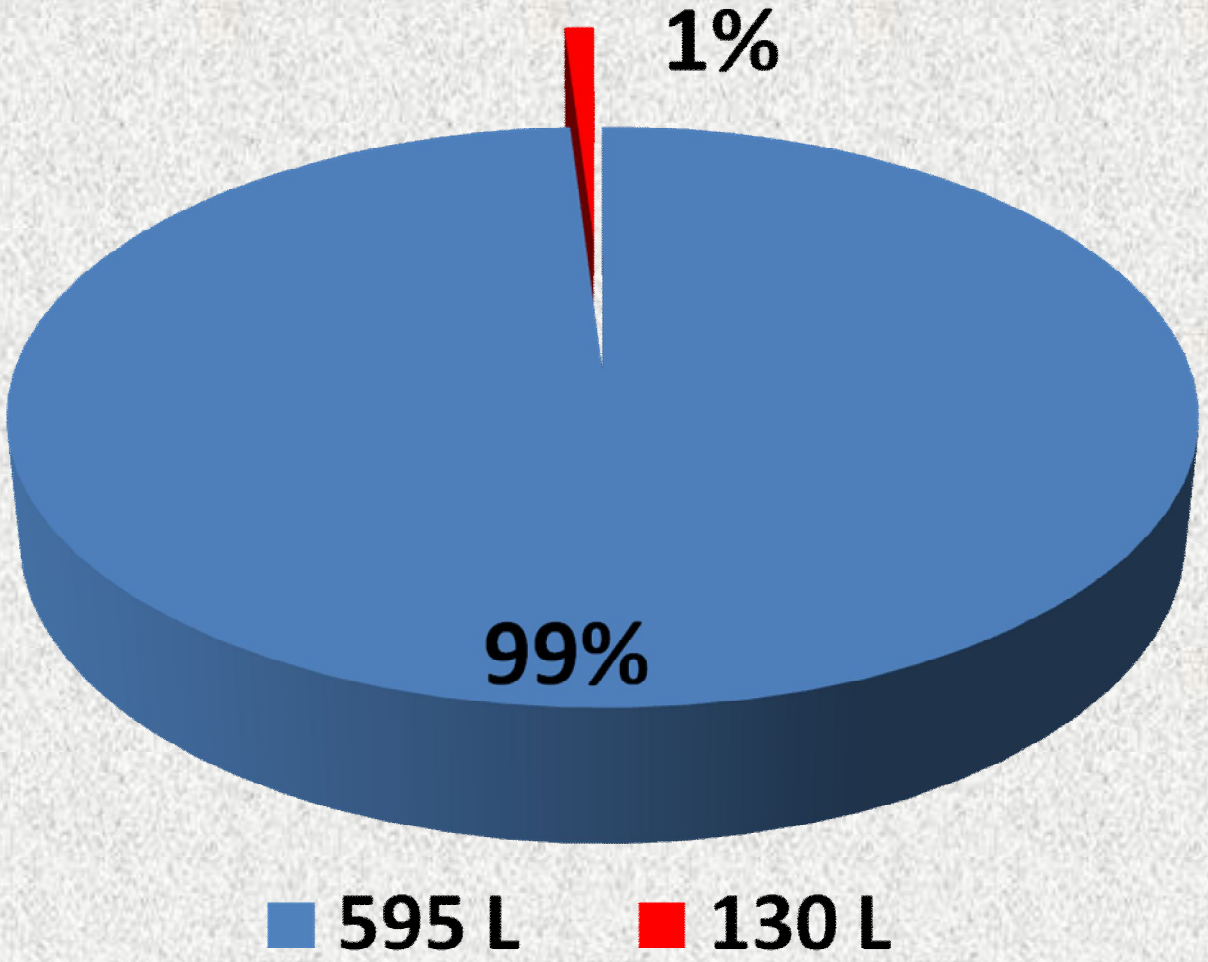
Vardiya Bazlı Problem Dağılımı



İnsan etkisi yok !

2. Breakdown the Problem

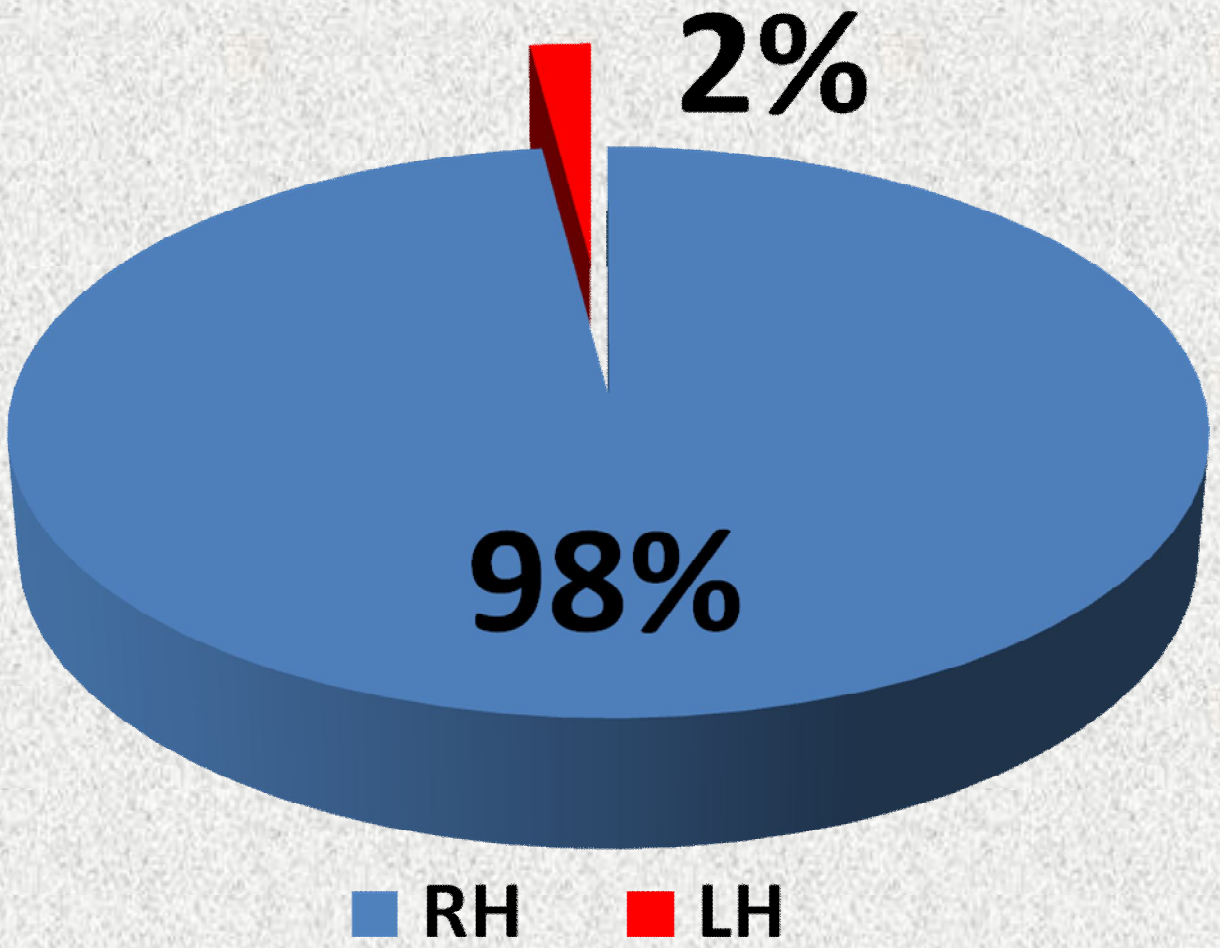
Üretilen Model Bazlı Dağılım



According to data, the surface defect is predominantly observed on one specific model (595 L).

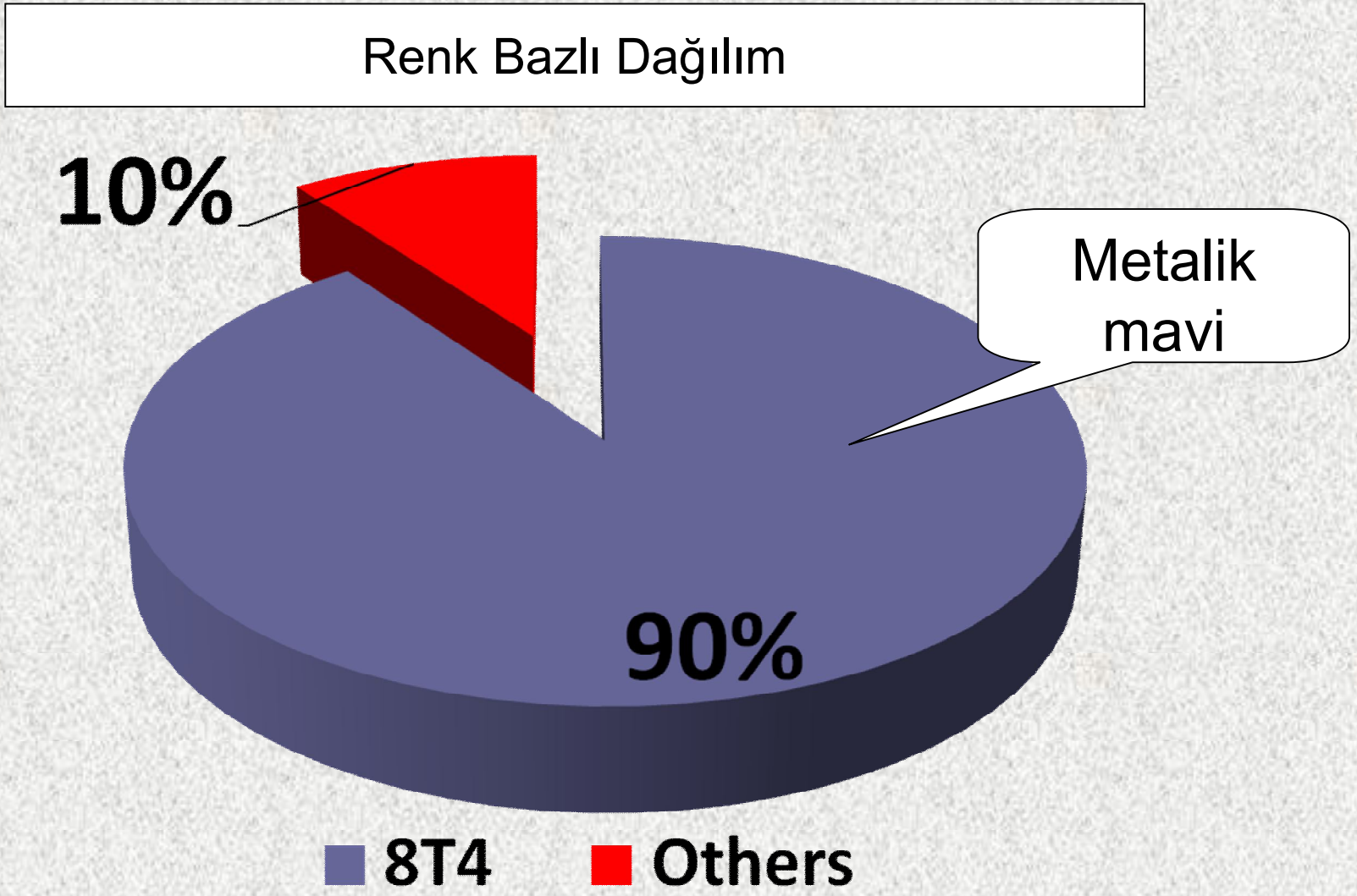
2. Breakdown the Problem

Sol / Sağ Ayna Dağılımı

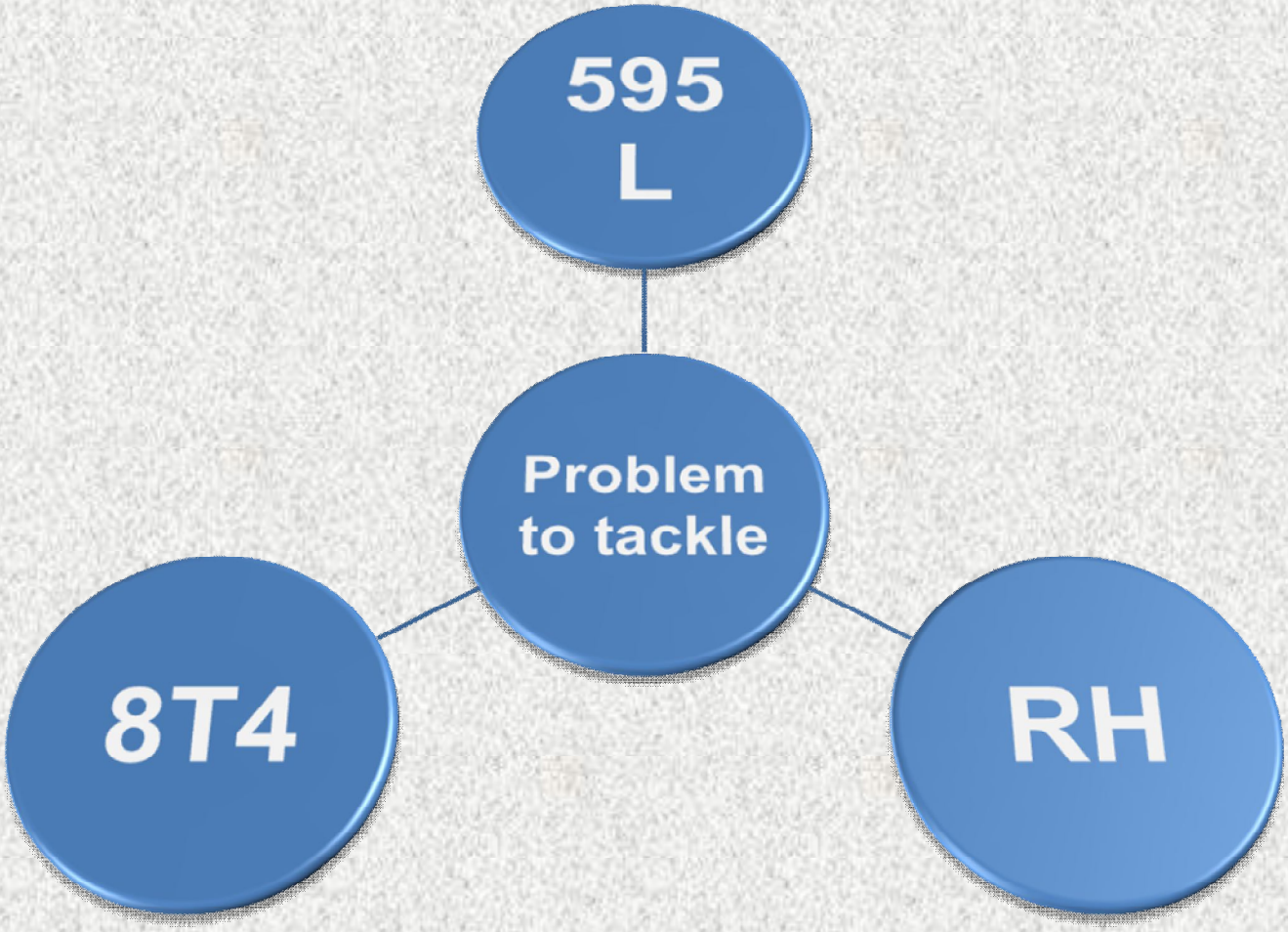


Defects are mostly encountered on the right mirror covers.

2. Breakdown the Problem



2. Breakdown the Problem



Ayna Yüzeylerinde yer alan "Yüzey hataları" problemi, 595L modellerinde, sağ tarafta ve 8T4 (Metalik Mavi) renkte ortaya çıkmakta

2. Breakdown the Problem

PROBLEMİN ÇIKTIĞI YER

3. Target Setting

Until the end of July ’09, the surface defect problem regarding mirror covers for **595 L** models, on the **right hand side** and when **8T4** paint is used will be reduced by **100%.**

S Spesifikfic ✓

M Ölçülebilir ✓

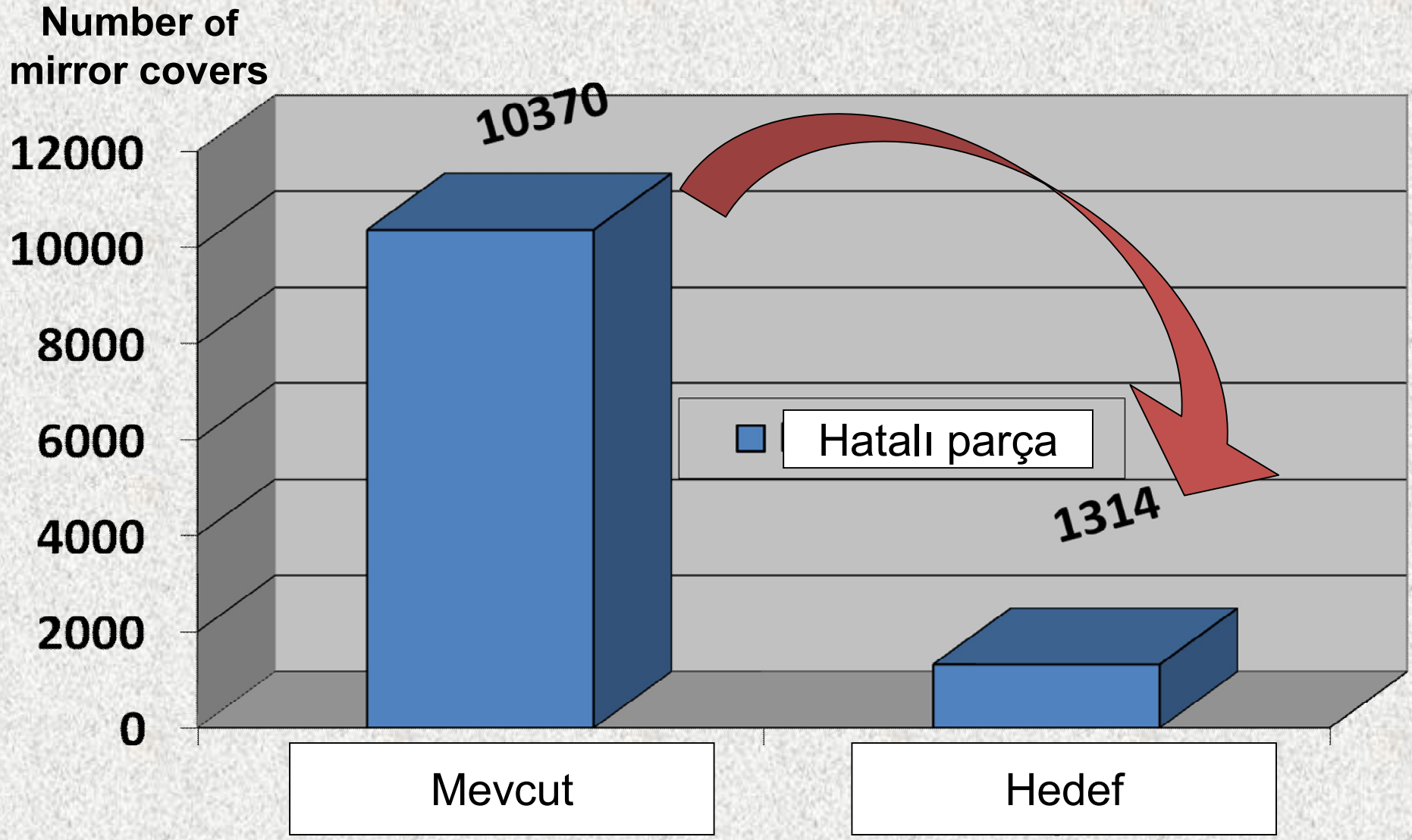
A Başarılabilir ✓

R Rasyonel ✓

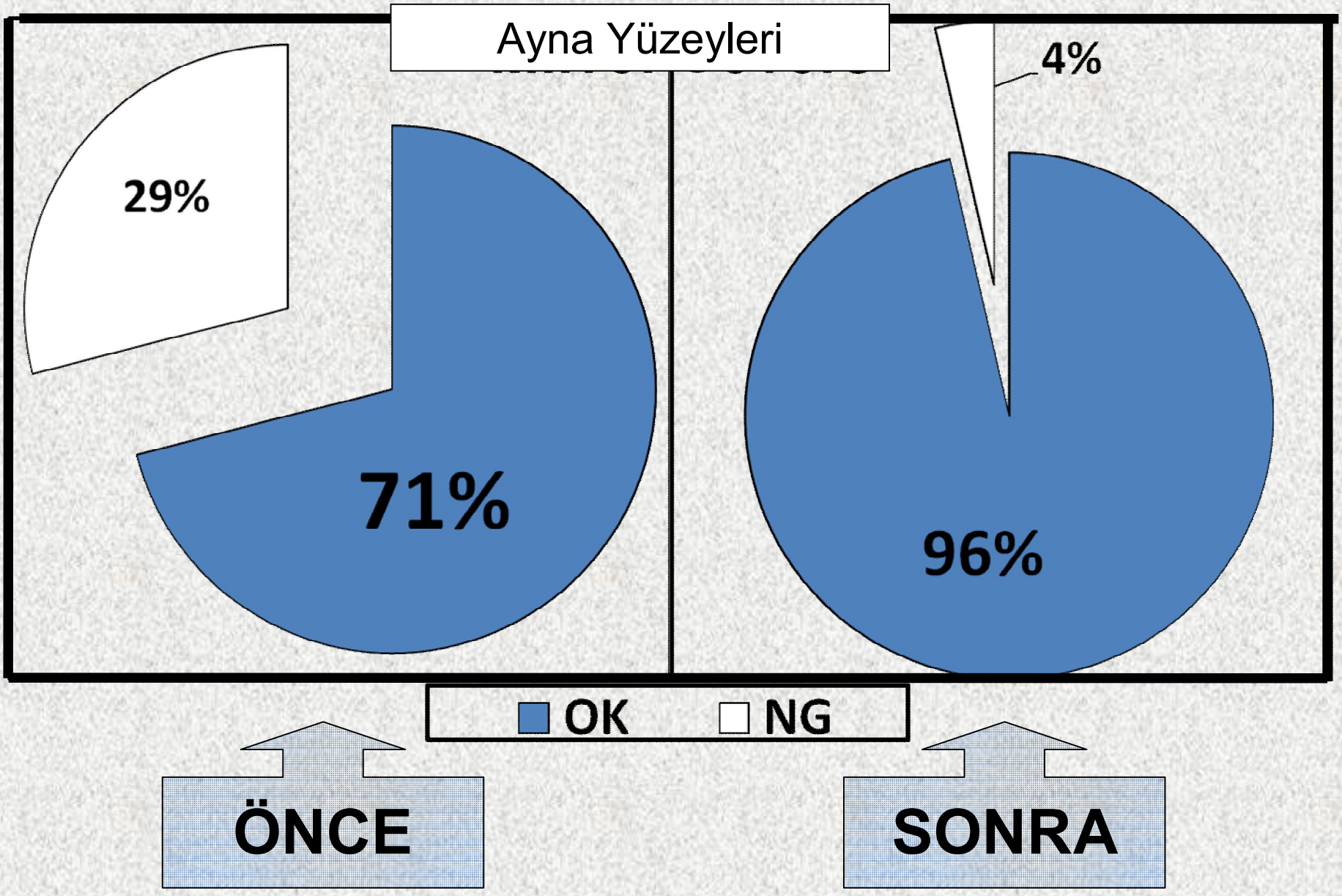
T Zaman bazlı ✓

3. Target Setting

Daraltılmış Problem Hedefi



3. Target Setting



4. Root-cause Analysis

Surface defects on RH mirror covers of 595L model when painted with 8T4

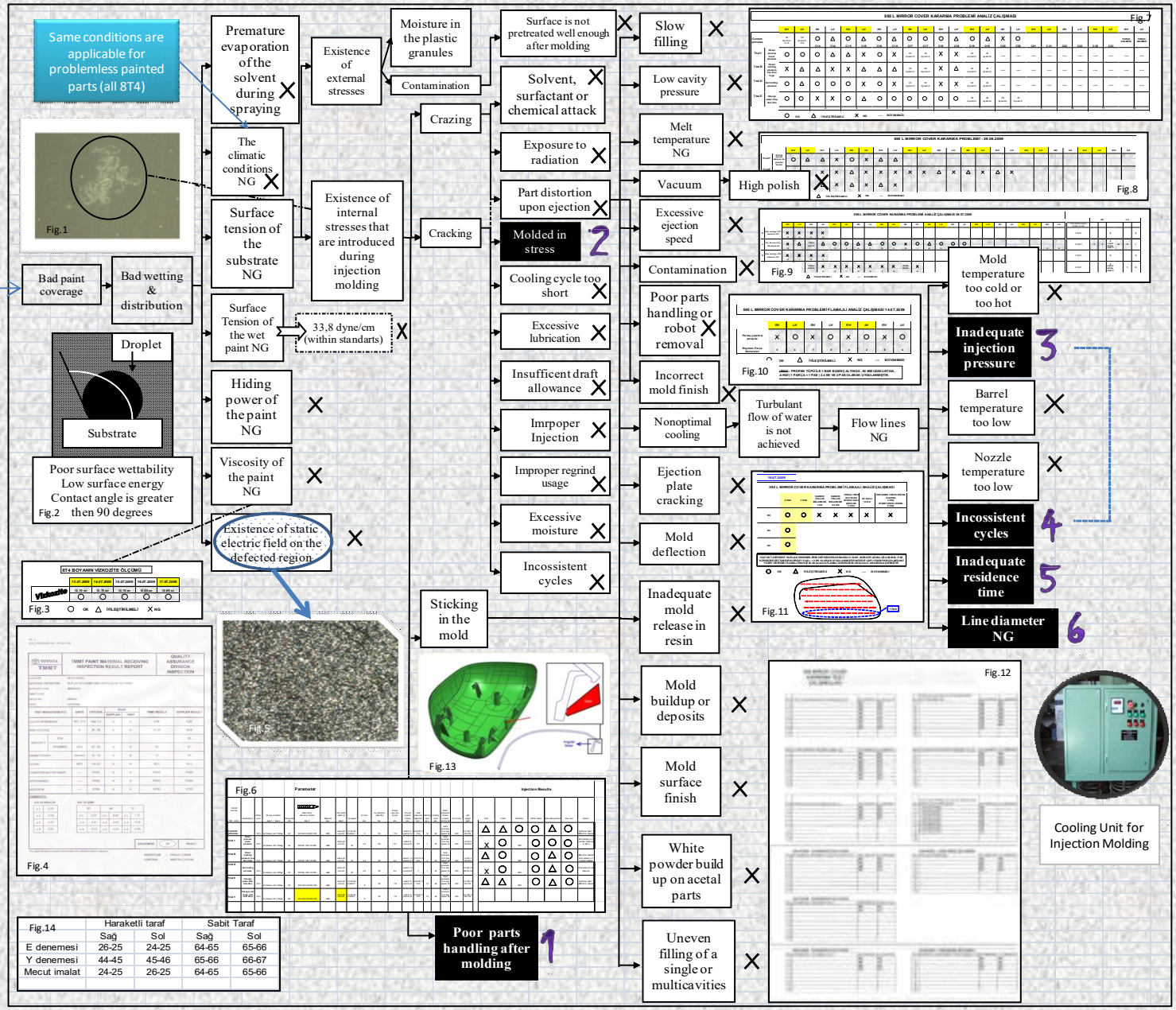
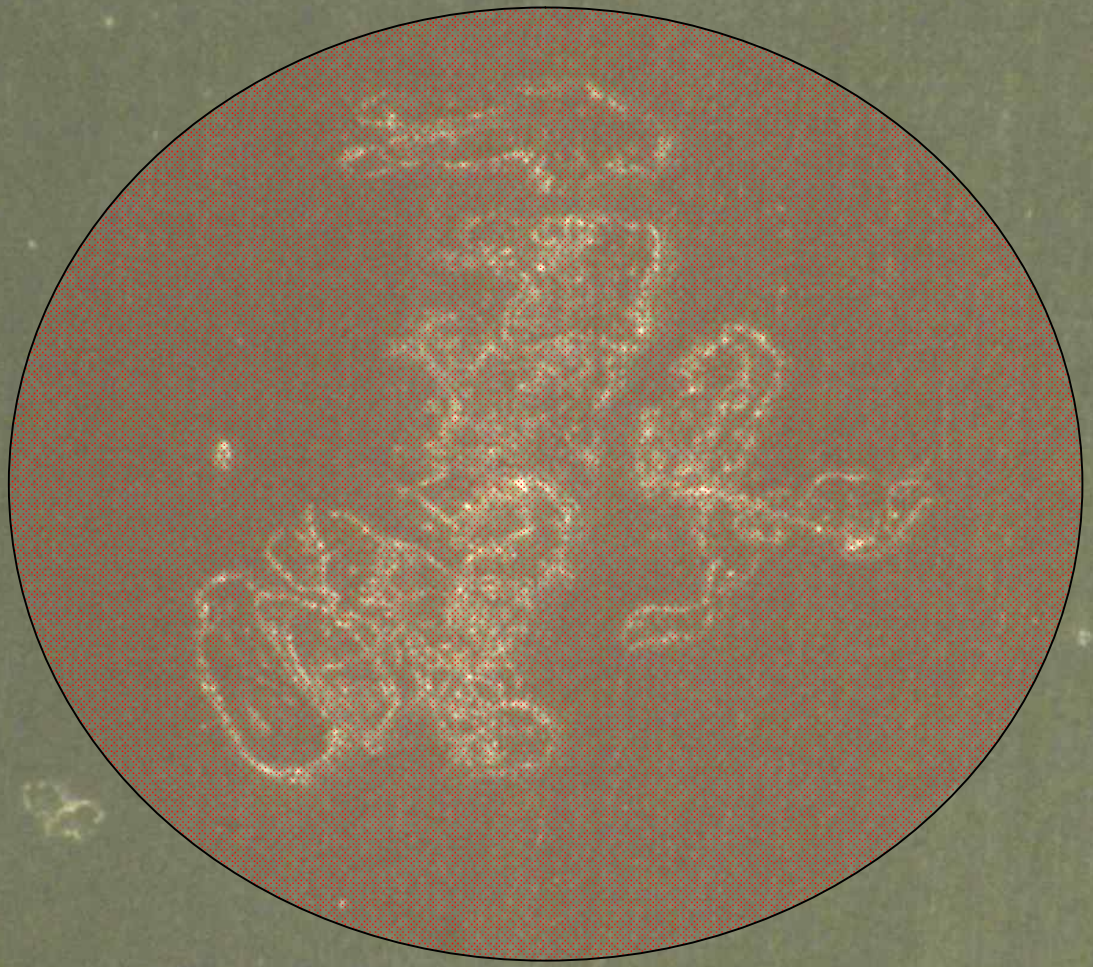


Fig.14

	Haraketli taraf		Sabit Taraf	
	Sağ	Sol	Sağ	Sol
E denemesi	26-25	24-25	64-65	65-66
Y denemesi	44-45	45-46	65-66	66-67
Mecut imalat	24-25	26-25	64-65	65-66

4. Root-cause Analysis



Crazing

5. Develop Countermeasures

R/C	COUNTERMEASURE	Evaluation						BEFORE	AFTER
		Effect	Cost	Quality	Applicability	Overall	Comment		
1	Automate & Standardize excess part removal after molding	Δ	Δ	Δ	X	X	Problem with effective application of processes concerning the supplier	NG	NG
2	Nitrogen Annealing	O	Δ	O	O	O	Efficient and easy to standardize	NG	OK
	Torching	Δ	O	Δ	Δ	Δ	Efficient but hard to standardize	38-40 dyne/cm	54-59 dyne/cm
3	Increase Flow Pressure	X	O	Δ	X	X	Permanent Solution not achieved	NG	NG
4	Change cooling liquid	?	O	?	O	?	Problem with effective application of processes concerning the supplier	?	?
5	Change Flow Line Path	?	X	?	?	?	Make sure the difference in temperature between in and out of water lines is less than 2°C	T_i-T_f>2°C	?
6	Increase Line Diameter	Δ	X	Δ	?	?	You need a Reynold's number of 5000 or greater to achieve turbulent flow (optimum cooling).	?	?

◯ very satisfactory △ satisfactory X unsatisfactory ? unknown