Three-Legged Five Why Analysis
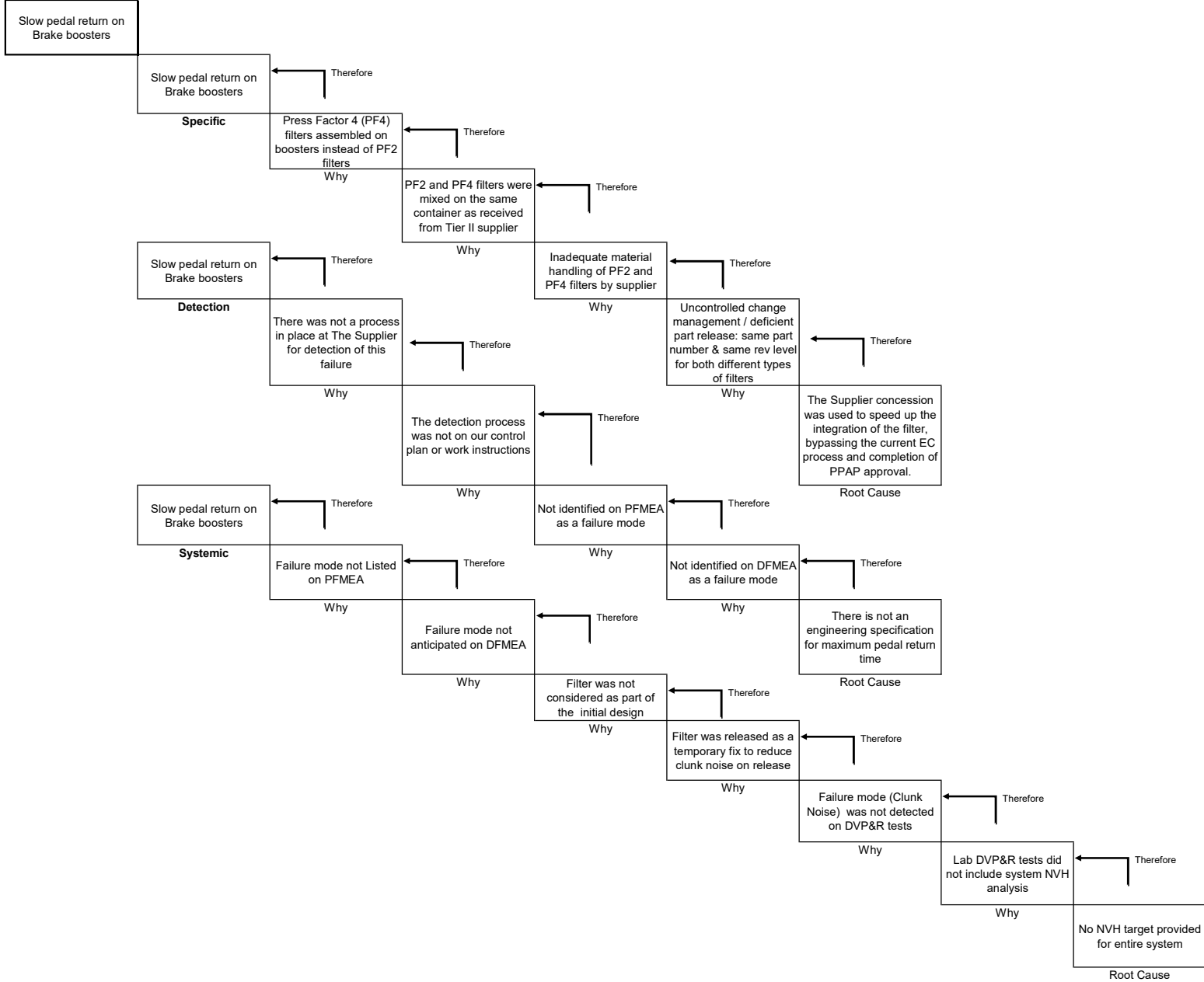
Issue number: H 080710   **Date of issue:** 6/26/2208   **Customer:** Mr Customer

Part / Process: 9R33 2B195BD / Booster Assembly

Issue description (i.e., What was wrong with the part when received by Customer?)

Slow pedal return on Brake boosters

Specific

Slow pedal return on Brake boosters

Therefore ←

Press Factor 4 (PF4) filters assembled on boosters instead of PF2 filters

Why

Therefore ←

PF2 and PF4 filters were mixed on the same container as received from Tier II supplier

Why

Therefore ←

Inadequate material handling of PF2 and PF4 filters by supplier

Why

Therefore ←

Uncontrolled change management / deficient part release: same part number & same rev level for both different types of filters

Why

Therefore ←

The Supplier concession was used to speed up the integration of the filter, bypassing the current EC process and completion of PPAP approval.

Root Cause

Detection

Slow pedal return on Brake boosters

Therefore ←

There was not a process in place at The Supplier for detection of this failure

Why

Therefore ←

The detection process was not on our control plan or work instructions

Why

Systemic

Slow pedal return on Brake boosters

Therefore ←

Failure mode not Listed on PFMEA

Why

Therefore ←

Not identified on PFMEA as a failure mode

Why

Therefore ←

Not identified on DFMEA as a failure mode

Why

Therefore ←

There is not an engineering specification for maximum pedal return time

Root Cause

Therefore ←

Failure mode not anticipated on DFMEA

Why

Therefore ←

Filter was not considered as part of the initial design

Why

Therefore ←

Filter was released as a temporary fix to reduce clunk noise on release

Why

Therefore ←

Failure mode (Clunk Noise) was not detected on DVP&R tests

Why

Therefore ←

Lab DVP&R tests did not include system NVH analysis

Why

Therefore ←

No NVH target provided for entire system

Root Cause

Permanent Corrective Actions	Timing
A - Specific 1.- Improve EC system in order to reduce review and implementation time. 2 .- Establish procedure with supply base to ensure that components subject to an engineering change are properly controlled and accounted for to ensure a clean break point. Sign-off to be conducted at Supplier's facility. 3.- Improve receiving inspection procedure for parts subject to changes (ECs)	
B - Detection 1.- Proposed implementation of a pedal return verification test at the brake booster assembly line to measure the return time. 2.- Release a pedal return time specification for brake booster assemblies.	1.- 7/14/08
A	
B	
C - Systemic 1.- Release NVH target for brake system. 2.- Implementation of new valve body in brake booster to reduce air flow capability and eliminate the need for the temporary filter. 3.- Ensure that DVP&R tests for booster assemblies capture all customer specifications, expectations and demands so that "design freeze" is achieved before process development. Validación de la vida útil del filtro y como impacta su degradación en el pedal return. Acelerar la implementación del nuevo valve body.	
C	

Read Across Actions	Timing	Lessons Learned Summary
No other valve body filters used in any other booster assemblies.	N/R	Do not release components that are very similar to the naked eye without adding engineering specifications that allow proper identification and segregation of material with different properties.

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