

DFMA® Forum - June 18-19 / 2024 BOOTHROYD DEWHURST, Inc

EARLY VALUE IDEATION ®

Finding Ideas with DFMA and then?

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DFMA Preventive Optimization - Organization

Working with DFMA brings many advantages in the early development phase. This is where organizations find and move around 70% of their product costs. But what is the basis for this?

Correct - it is the management's decision to invest in these preventive measures.

But why should a manager do this? What does he get back in return?

Role of the management / stakeholder

Management – especially in these times of transformation – is huge responsibility. Management takes the risk of product development They invest money in tools for development (also, DFMA), invest money for education and training, invest money for prototypes and qualification, and spend a lot of time for controlling and monitoring.

So why should the invest more time and money in preventive measures like team meetings? This is always a major reason why VAVE/DFMA measures or workshops are cancelled or postponed.

Are they not aware of the output of a DFMA activity?

Are you aware of the output of a DFMA activity?

Holding a DFMA workshop doesn't just mean harvesting quick "low hanging fruits", but often complex innovations that affect many parts but can also move a lot of money.

How to plan and conduct DFMA® activities with EVI®

To support Product- / Project management Activities with DFMA should / could be planned a little bit more in detail.

The typical information flow interacting with project management is the team, the quantity structure and a milestone plan. So exactly that is the starting point.



Project starting point EVI®

The starting point of EVI is the interface to the PMO (Project management office).

Normally there is a quantity structure over time, a team and a timeline with gates or milestones. Exactly this could be selected for each project. Also a shift model (for estimation of the tact time) and characteristically variants for a product can be determined. (i.e. Right-hand drive / Left-hand drive).

Project details											-	- 0	×
Project 1 -	Pneumatic cor	itrol										•	/ 🗊
Industry data	Team / gates	Product	Ideas	State									
Project	ID Project 1				Customer	PNEU			Ramp	characteristic			
	ion Pneumatic o				Stakeholder	Management (M)		\sim	Line	ar 💿 Manual			
DFA	file <u>C:\Users\HP</u> Ratio pr	<u>\OneDrive - konze</u> oject	pt WERT\Dokume	<u>nte\D</u>	Creation date	12/10/2022 15	I-Initial	~					
Manufacturing q	uantity				Product variation	ins			Man. rat	es during ramp up	Update man.	Gra	aph
Manu. quanty. p.a		rt of production	12/9/2		Name		Share		Years	Manu quantity p.a.	Total quantity	Increase	Takt time
Years to amort.	2 Am	ort. manu. quant		170,000	Variant A Variant B			25% 75%	2024	85,000	85,000	85,000	15
Lifecycle duration	10 Life	cycle manu. quant		850,000	Variant B			/3%	2025	85,000	170,000	0	15
									2026 2027	85,000 85,000	255,000 340.000	0	15 15
ldeas / engineeri	ng	Efficiency							2028	85,000	425,000	0	15
Hourly rate dev	€100.	00 Efficiency		85.00					2029	85,000	510,000	0	15
Amortisation of id	eas	3 Scrap		0.00					2030	85,000	595,000	0	15
									2031	85,000	680,000	0	15
Shiftmodel									2032 2033	85,000 85,000	765,000 850,000	0	15 15
									2000	05,000	050,000		
Two shifts - 250 -	2 Y Two shi												
No of shifts		2							<				>
Duration minutes	4	80											
Workdays p.a.	2	65							Taktzei	it - Auswahl			
									Min	Max 🖲 Ma	nuell		
Close	OFMA is a re	gistered trademark	of BDI - USA (ww	w.dfma.com)								🔓 User	manual

Then... conduct a DFMA workshop but with ONE requirement.

No discussion - Only questions - and ideas

(Also possible with an online whiteboard in MS Teams)

The typical output as we know it are a lot of ideas.



How to assess the ideas within EVI®

Ideas normally categorized according to the Suggestions for redesign of DFA. And then, every idea will be assessed within EVI®

What is the advantage of working out an idea within a team?

It is a second creative process and brings the expertise of every team member together.

NOW – DISCUSSIONs are allowed \rightarrow towards a goal.

- Suggestions for redesign
Category 1
 Candidates for elimination other than fasteners and connectors
Category 2
Fasteners
Connectors
Separate operations
Category 3
Handling or insertion difficulties

Hale GmbH



Assessment of ideas within EVI®

Every idea can be listed within the project. Starting with the description and the "Post condition" means the target situation of the idea.

dustry data	Team / gates	Product	Idea:	s	State											
Numb er Des	scription	Post condition	Sketch	Weight [kg]	Direct costs	Invest costs	Total Amort	Total Lifecycle	w	т	с	F	Impl. year	Category	State	State filter
01 Pist		Piston manufactured as one part	ž.	0.00	(€0.81)	€13,500.00	(€0.64)	(€0.78)	1	2	2	1	2024	Piston	D Im	A Implement B Check
02 Pist		Piston-stop will be combined with the cover		0.00	(€0.34)	€2,000.00	(€0.33)	(€0.34)	1	2	2	1	2024	Cover/Endsto	B Che	C Implement later D Implemented M Additional function
03 Pist	on	Reibung optimiert	IRIN	0.00	(€0.15)	€0.00	(€0.15)	(€0.15)	1	1	1	3	2024	Piston	D Im	R Rejected
04 TES	T DXM	neue Idee Ziel	140 F	0.00	(€0.68)	€3,000.00	(€0.66)	(€0.68)	2	2	1	3	2024		A Imp	V Variant (not implemented)
05				0.00	€0.00	€0.00	€0.00	€0.00					2024		A Imp	Category
																Ø Piston No. of ideas - Total 5 No. of ideas - Rated 4 Total costs lifecycle - A (€0.68) Total costs lifecycle - B (€0.34) Total costs lifecycle - C €0.00 Total costs lifecycle - D Total costs lifecycle - D

Then, open the evaluation dialog to assess the idea and insert the data getting out of DFA working sheet. (the DFA analysis helps to get coordinated information) and is the

Content Ta	sks Effects	Description								
e condition (sales p	lanning at baseline)								Sketch pre	Zoom
iston will be st	opped by an se	perate part					Past	e from template		
Description	Comment	Part number	Labor costs	Part costs	Quantity	Manu. invest	Assembly invest	Part weight [kg]		
Steel cover		1234-5	€0.140	€0.100	1.00	€1,000	€	0.00000		
Screws		1234-6	€0.240		2.00					
		1234-3	€0.060	€0.350	1.00	€5,000	€2.50	0.00000 0		
Piston stop		1234-3		0.530		0,000				
tal Labor costs: €0.44		Part costs: €0.51 Weight: 0.0000 kg			u. invest: €6,00					
Piston stop tal Labor costs: €0.44 tal Assembly invest: €2,5	00 Total	Part costs: €0.51							Sketch finished	Zoom
tal Labor costs: €0.44 tal Assembly invest: €2,5	00 Total	Part costs: €0.51	Risk	Total Mar	u. invest: €6,00	0			Sketch finished	Zoom
tal Labor costs: €0.44 tal Assembly invest: €2,5	00 Total	Part costs: €0.51 Weight: 0.00000 kg	Risk	Total Mar estimation	u. invest: €6,00 ime C	0 ost Fun		Decision	Sketch finished	Zoom

starting point for discussion.

After the team created a target situation (with a sketch and a brief description)

change to the "post situation" and describe all necessary changes. And copying the

sketch in. The result is a cost balance considering also investment and depreciation time.

Cost balance incl. c	hanges and invest	
	per part	over time
Amortisation	(€0.33)	(€55,800.00)
Lifecycle	(€0.34)	(€287,000.00)

But cost is only one side of the medal. Also, project risks must be considered.

Hale GmbH



Risk estimati	on			
Weight	Time	Cost	Function	Decision
11 ~	21 👋	21 ~	11 ~	B () ~

After a common estimation of technical risks, the team decide on the next steps.

Tasks within the idea

Of course, to convert an idea into money there are some tasks necessary, which can

Content Tasks Effe	ects Descript	ion						
Description	Responsible	Due date	Meeting	State	Priority	Capacity (h)	Dev. / Change	costs
/lake a sketch	Rene Machrech	01.07.2024	5/15/2024 Manufacturing Review	open	medium	4	Hours to spend	0
oroduce prototypes	Helge Müller	01.07.2024		open	medium	24	Hourly rate	€100.00
RFQ for Piston stop	Jona Than	01.07.2024		open	medium	16	Add. expenses	€0.00
estergebnisse liegen vor	Jona Than	01.07.2024		open	medium	33	Dev. costs	€0.00
skdöfkösdf döfkösdkfd							Dev. costs / part	€0.00
							Dev. costs / part	

also document. Specifically, every task could be linked to planned meetings.

But why all do this?

The results for the management

Related to the project

dustry data Te	am / gates Product	Ideas	State	
] Only implemented	idea 🗹 A ideas	P ideas	V	C ideas
	No. ol	f ideas - Total: 3		
1006				-
0K-				
-100K-				
-200K				Wei
				ght f
4004-				xoten
9-300K- -400K- -500K-				(1) (2) (2) Weight potential per product
S-SUUK				Der p
-600K-				rodu
-700K-				đ
-800K				
-900K				
Potential S	tk1 lifetime € Potential Stk1 amort, dur	Investment potential	é Weight potential [kal

After finalizing the ideas, the project leader has direct overview over all ideas and potentials and all the necessary tasks to realize the ideas.

Over time it is possible for the

■ A implement ■ A i

project leader to see how the potentials are converted

into money. (burndown chart)

Related with the idea repository

Every idea could be a creativity stimulus for others. For that reason, within EVI it is possible to search and reopen every recorded idea.



It is also possible to search for ideas only by name a possible component within an

ldea list									-	×
iea list										6
Search id	iea 🗌 🗌 ie	cl. Components State		~ 0	ustomer		~ F	roject		v
Number	Description	Post condition		Category	State	Customer	Project	Total Lifecycle		
000	Basic Idea	POST	1.0		A Implement	Demo 0	Project 0	-4.33	EUR	1
001	Piston	Piston manufactured as one part	Ŧ	Piston	D Implemented	PNEU	Project 1	-0.78	EUR	
001	Stecker verbinden / Connector combine (Kopie)	One combined wire	Æ		D Implemented	Demo 3	Projekt 3	-0.29	EUR	
001	Piston (Kopie)	Kolben wird aus gegossen	ž		V Variant (not implemented)	Demo 0	Project 0	-0.54	EUR	
001	Piston	Kolben wird aus gegossen	Ŧ		8 Check	Demo 0	Project 0	-0.54	EUR	
002	Idee Nr. 2	nachher		Elektronik	8 Check	Demo 0	Project 0	0.02	EUR	
002	Titel	Nachher	-		A Implement	Demo 3	Projekt 3	0.00	EUR	
002	Piston Stop	Piston-stop will be combined with the cover		Cover/Endstopp	8 Check	PNEU	Project 1	-0.34	EUR	
003	Piston	Reibung optimiert	IRM	Piston	D Implemented	PNEU	Project 1	-0.15	EUR	
003	Stecker verbinden / Connector combine	One combined wire			A Implement	Demo 3	Projekt 3	-0.29	EUR	
003	Idee aus Präsentation	nachher			A Implement	Demo 0	Project 0	-0.16	EUR	-
003.1	Idee aus Präsentation Variante	nachher	6		V Variant (not implemented)	Demo 0	Project 0	-0.50	EUR	
004	TEST DKM	neue Idee Ziel	-		A Implement	PNEU	Project 1	-0.68	EUR	
004	Neue Idee	anders			A Implement	Demo 3	Projekt 3	0.00	EUR	
004/1	Idee mit Cliff	nachher	-		8 Check	Demo 0	Project 0	-0.38	EUR	 -
005					A Implement	PNEU	Project 1	0.00	EUR	
01	Make Housing in one part	One part	ø		D Implemented	Demo 2	Project 2	-0.77	EUR	
02	Make base with included bushings	One part different material	11		8 Check	Demo 2	Project 2	-0.41	EUR	-,

idea.

The sketch of the target situation is also helpful to have a visual support to identify different ideas.

Related to the overall situation



Output:

Every idea within a project leads to higher profit for the company.

If you summarize all the ideas of a project, the result is a huge amount that makes it possible to check how ideas (or innovative strength) drive

a company forward.

And, why management never should think about to reduce the preventive measures of DFMA within project management.