

**NSRP** | National Shipbuilding Research Program

# Utilization of Technical Data for Cost Estimation and Change Management

Jan Fischer and Pat David

March 7, 2017

Charleston, SC, USA



DISTRIBUTION STATEMENT

# Challenges of Cost Estimation

Time pressure in quoting

Project complexity

Lack of information in early project stages

Organizational separation of the included parties

Cost prognoses come along with uncertainty inevitably



# Available Data in Design Systems

## Model Based Engineering

### Design Components

Hull  
Structure  
Pipe  
HVAC  
Electrical  
Major Equipment List (MEL)  
Bill of Materials (BOM)

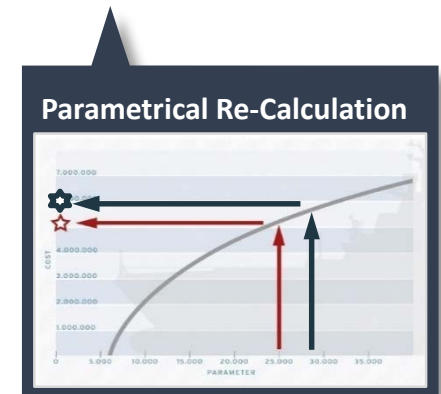
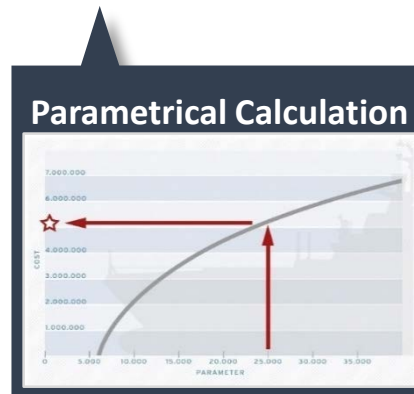
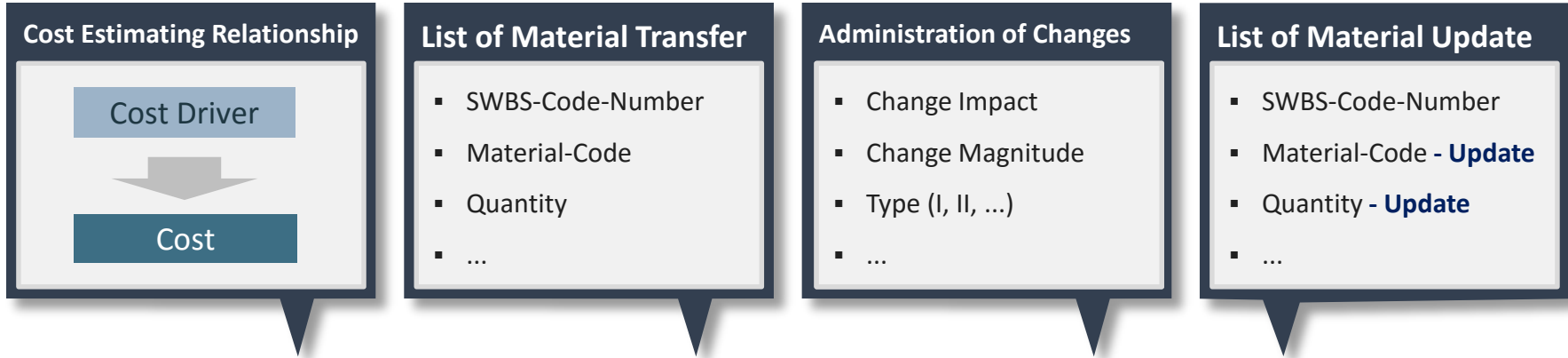
Ship Work Breakdown  
Structure (SWBS)

Build Sequencing/Strategy

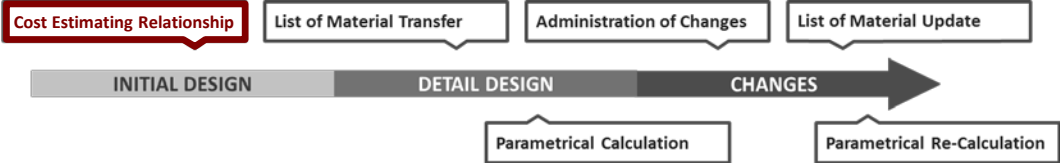
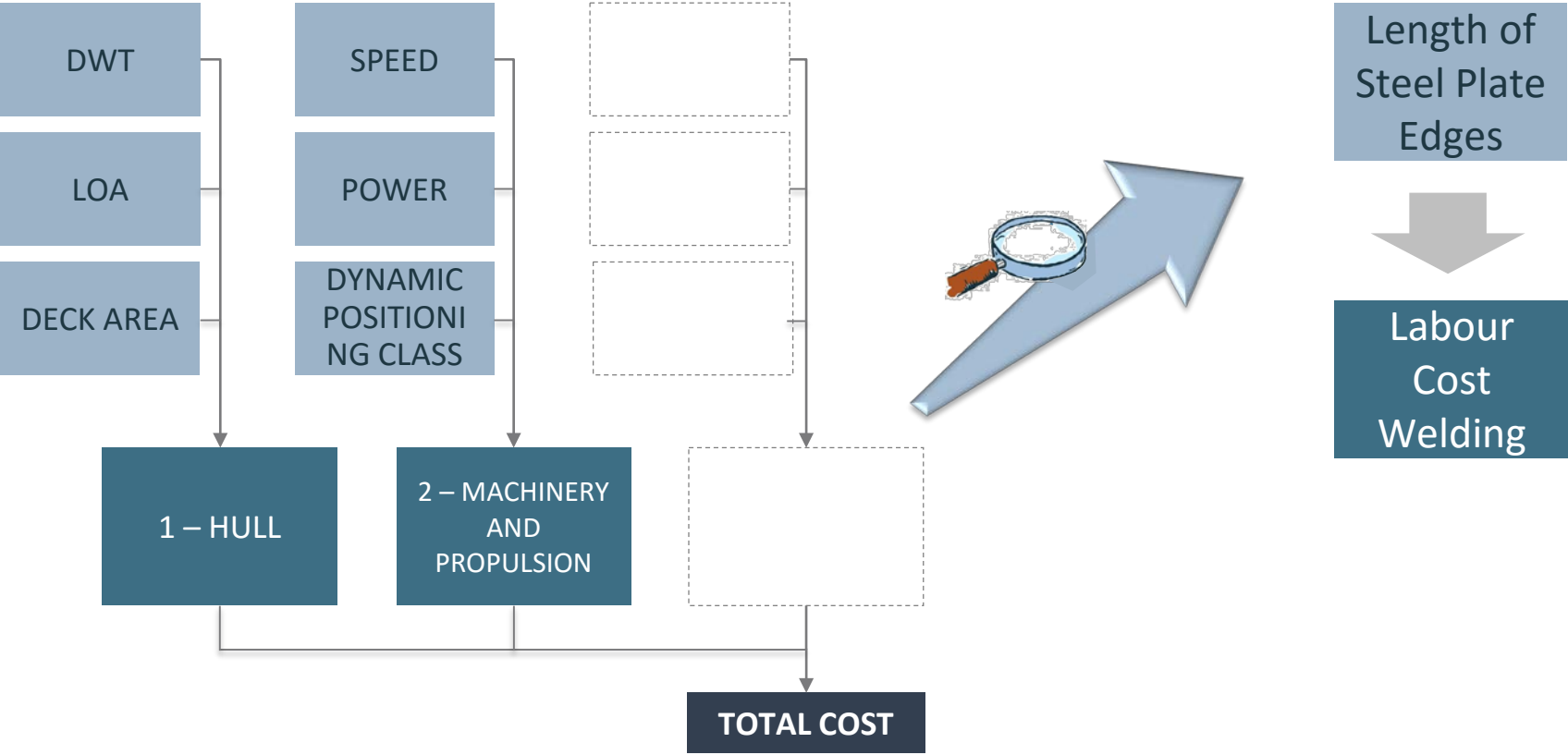
Bill of Materials (BOM)



# Application Fields of Software Integration



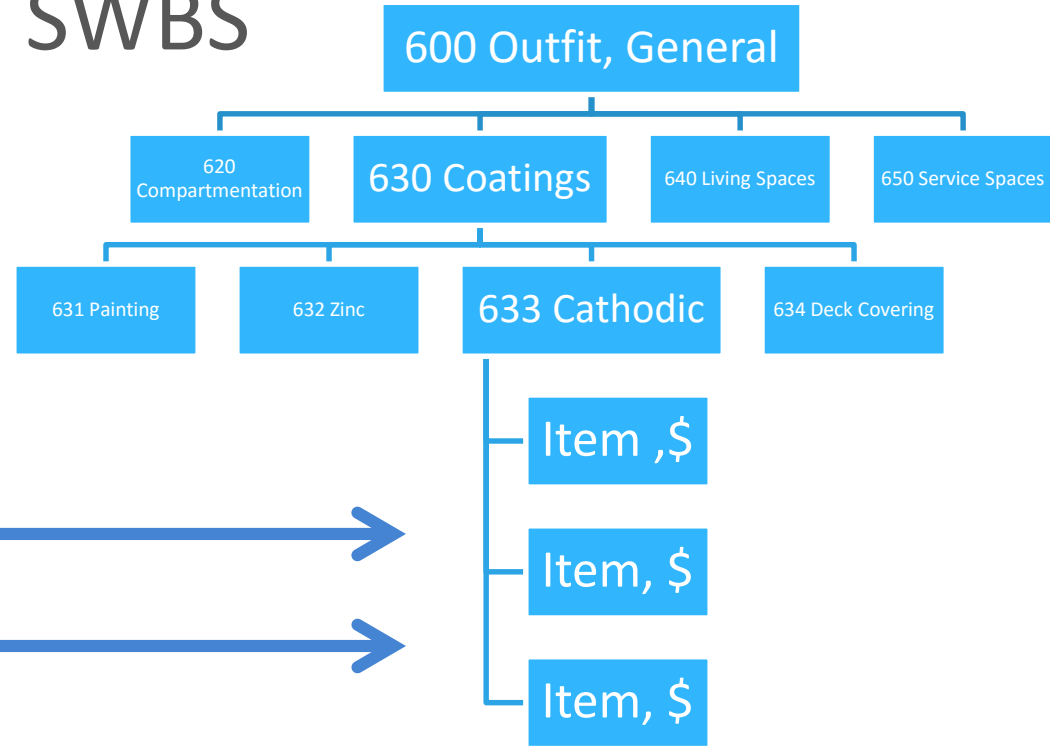
# Cost Estimating Relationship



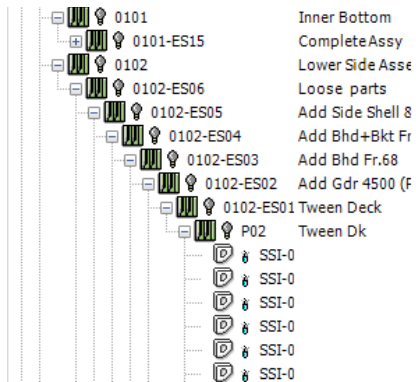
# List of Material Transfer



## SWBS



## Model BOM



# Parametrical Calculation

Automatic calculation of labor hours steel work: Based on the value of a selected cost driver ① and a functional relationship ②, the resulting number of labor hours is calculated ③ and utilized for the project calculation.

**1100 - HULL**  
**020 - Labor hours steel work**  
Quantity Steel work [h], depending on:

Parameter	Value (x)	Influence
Length over all [m]	79,10	?
Length between Perpendiculars [m]	74,80	?
Beam extreme [m]	13,10	?
Draught [m]	3,30	?
<b>Hull weight [t]</b>	<b>712,00</b>	?
Hull surface [m2]	1.180,00	?
Surrounded volume [m3]	2.960,00	?
Propulsion power [kW]	11.715,00	?

Only parameters with cost influence on current group  
Function type: Linear

$y = 150 * x + 200$

Parameter: 712,00    Quantity: 107.000,00    f(x)

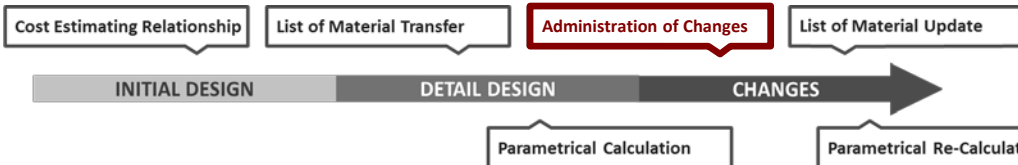
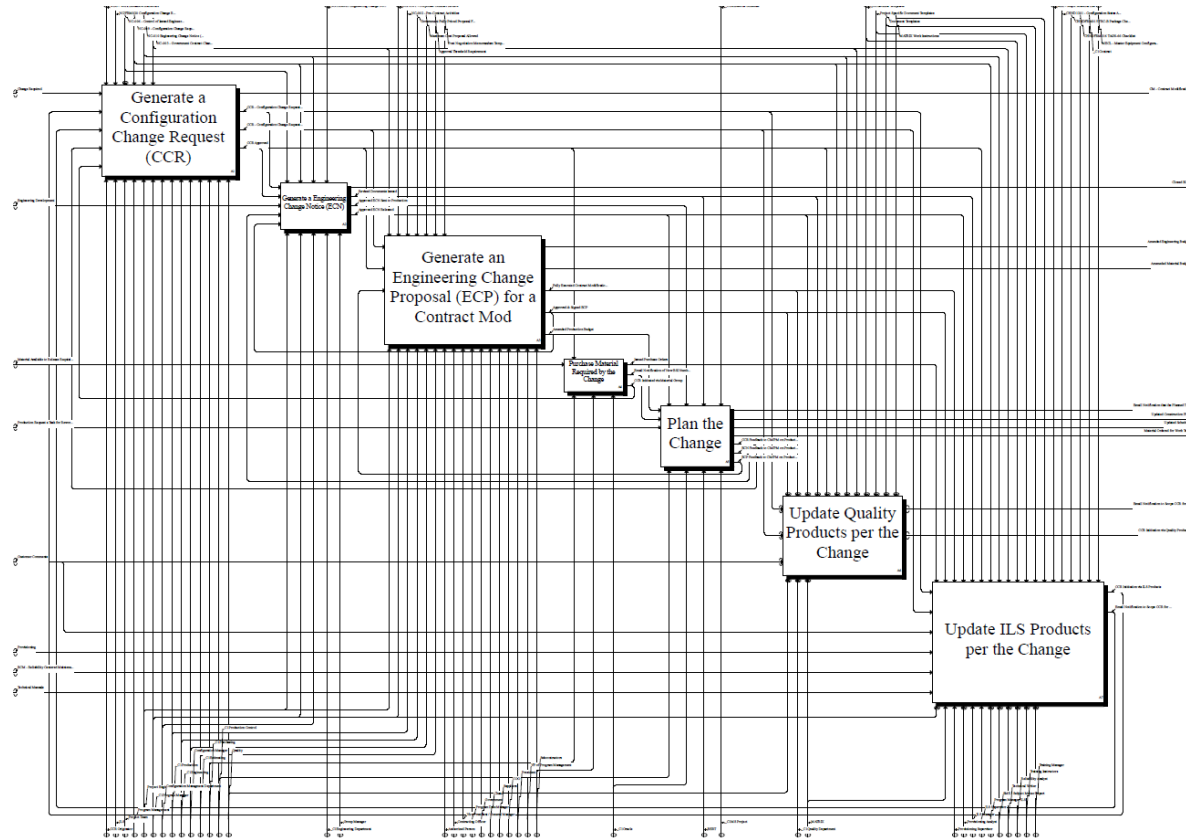
Quantity Steel work [h]

Hull weight [t]

Function pool    Insert    Project functions    Cancel



# Administration of Changes

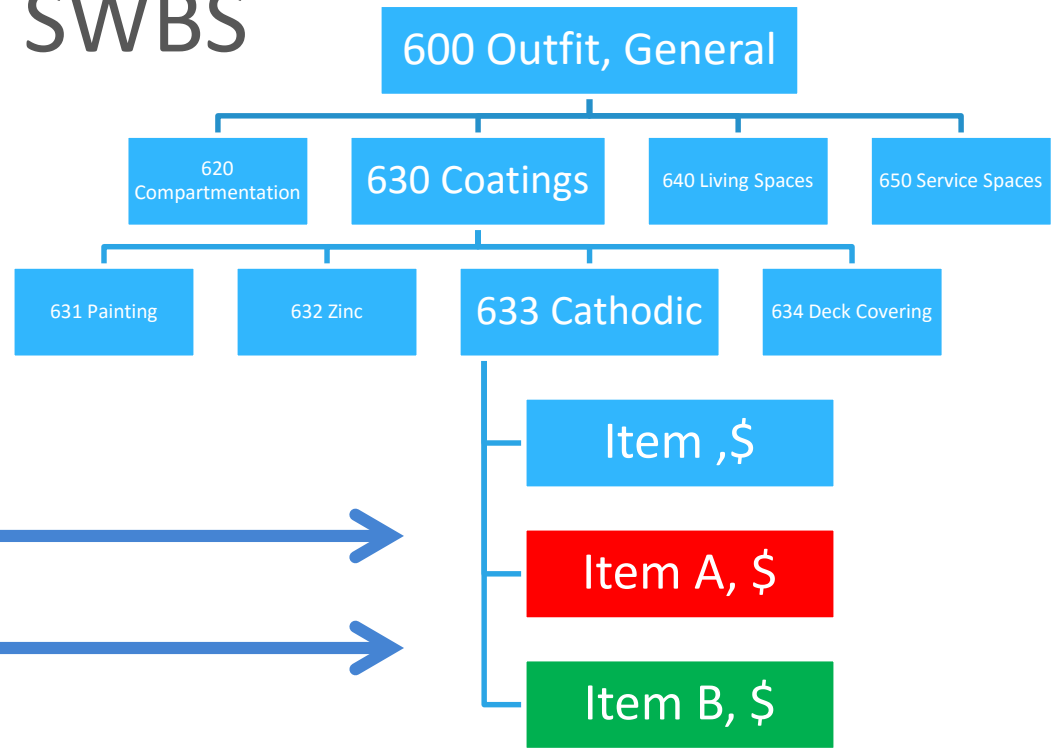




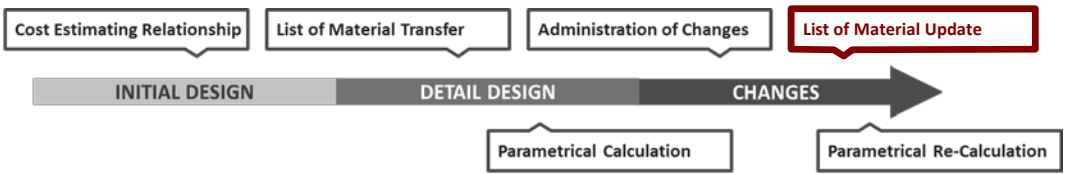
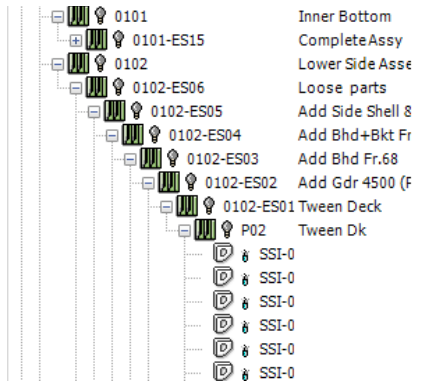
# List of Material Update



## SWBS



## Model BOM



# Parametrical Re-Calculation

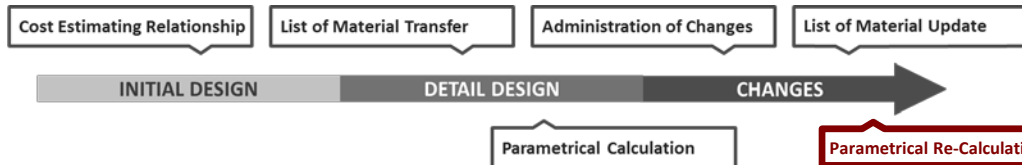
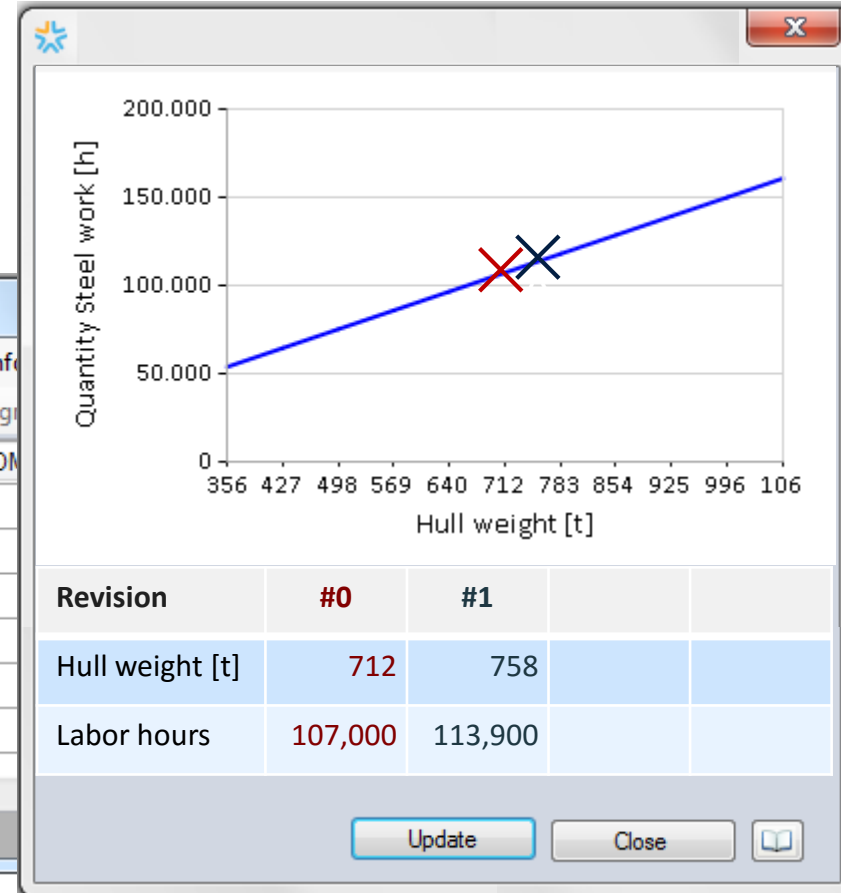
An alert shows the design changes influencing the calculation. After checking the impact, the user can update to the current value.

Edit Costs

Quit Editing Proposals Insert Copy Settings Documents Regression Info

Insert new row Copy row Delete selection Load all groups Define group

ID	Name	Quantity	Unit	DMTC/Unit	DMTC
005	Hull Engineering	8.800	Hull engineering [h]	0	
010	Steel Hull Structure	712	Steel, standard [t]	1.050	
020	Labor hours steel work	107,000	Steel work [h]	0	
025	Supervision (Third party)	1.300	[h]	0	
030	Steel Waste	105	Steel, standard [t]	1.050	
040	Consumable Welding	45.135	[kg]	2	



# Integration of Design and Cost Data

Cost management ripe for investigation

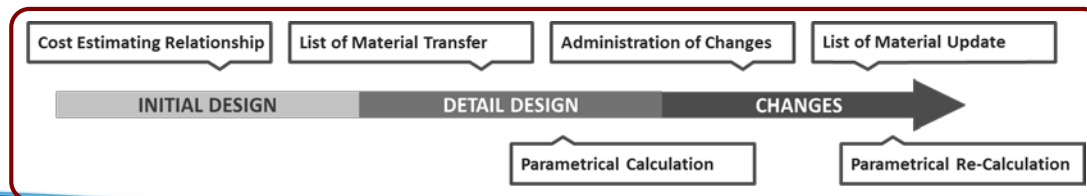
Leverage multiple previous project results

ERP Integration

Production Planning Integration

Dynamic Change Awareness

Enterprise-wide implications



# Thank You!

Jan Fischer, COSTFACT, GmbH

Pat David, SSIUSA

