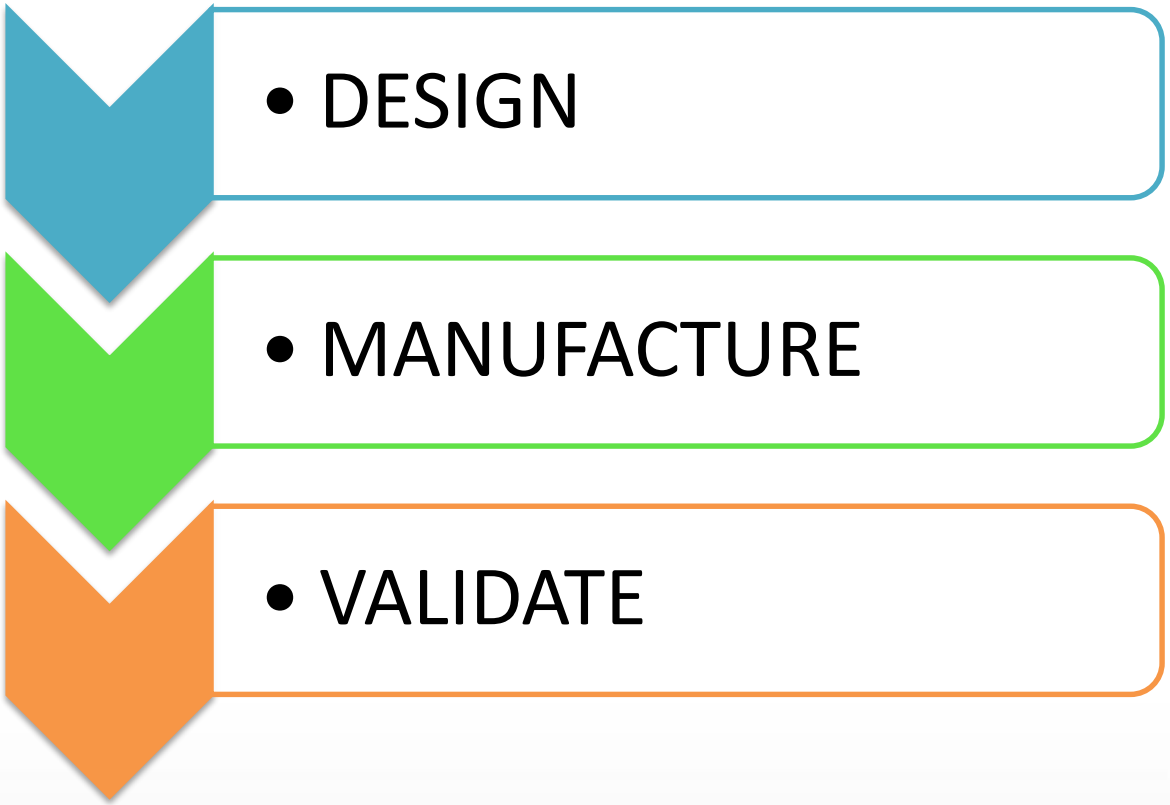
Dies & Moulds – Process Flow

3D Concept Tooling

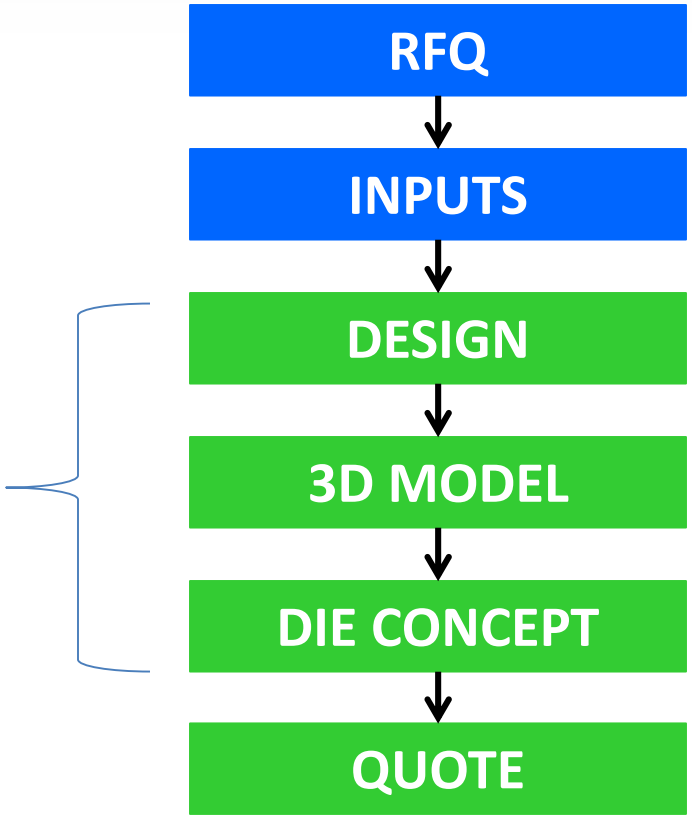
January 2015

Dies & Moulds

Three distinct phases of Die / Mould Manufacturing cycle



1 – Design Phase



Inputs can be in the form of 3D Model, Part drawings or the physical part itself. Inputs vary from customer to customer.

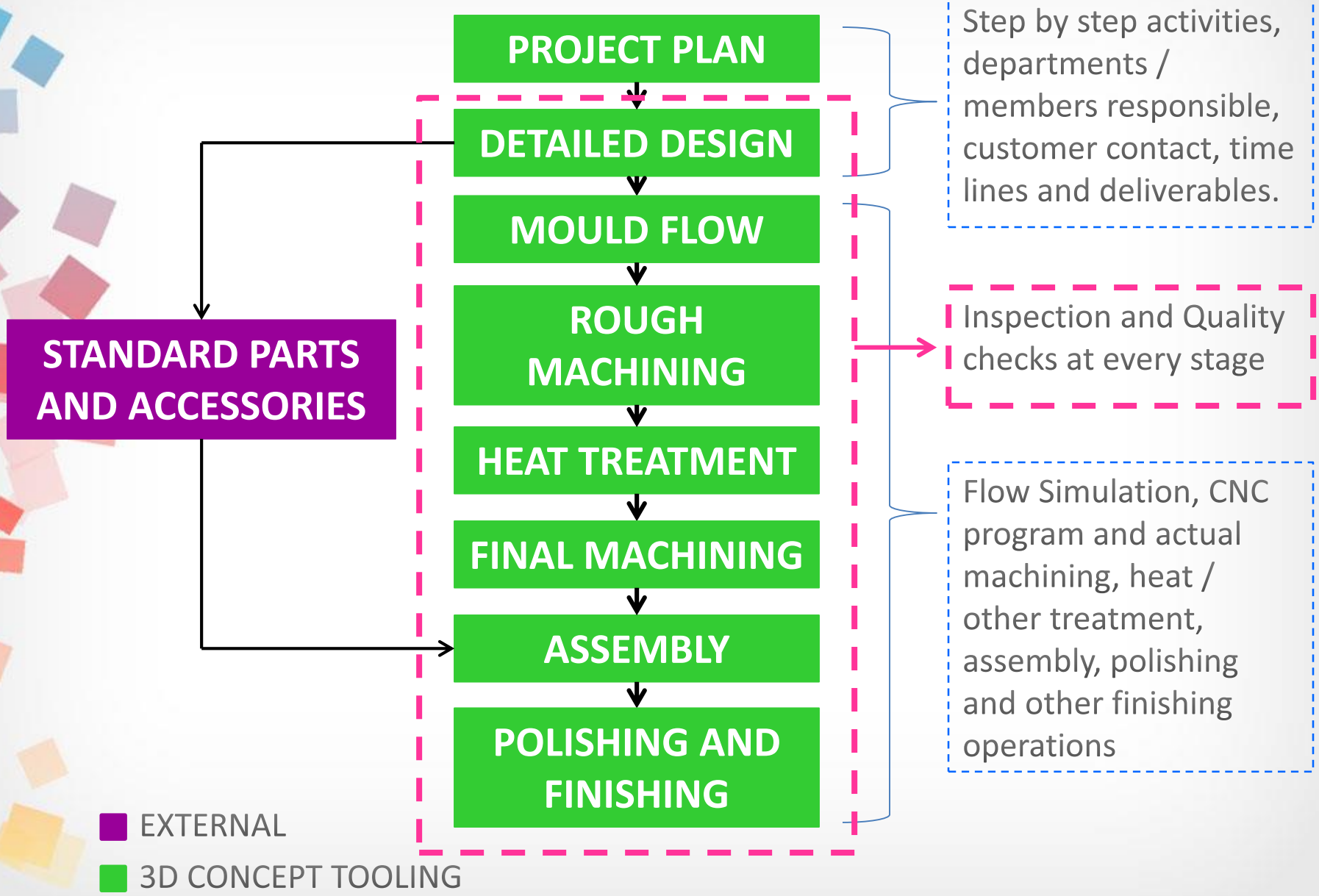
Design department models the part, Die concept is created with all necessary standard parts and accessories

comprehensive quote with detailed breakup is generated

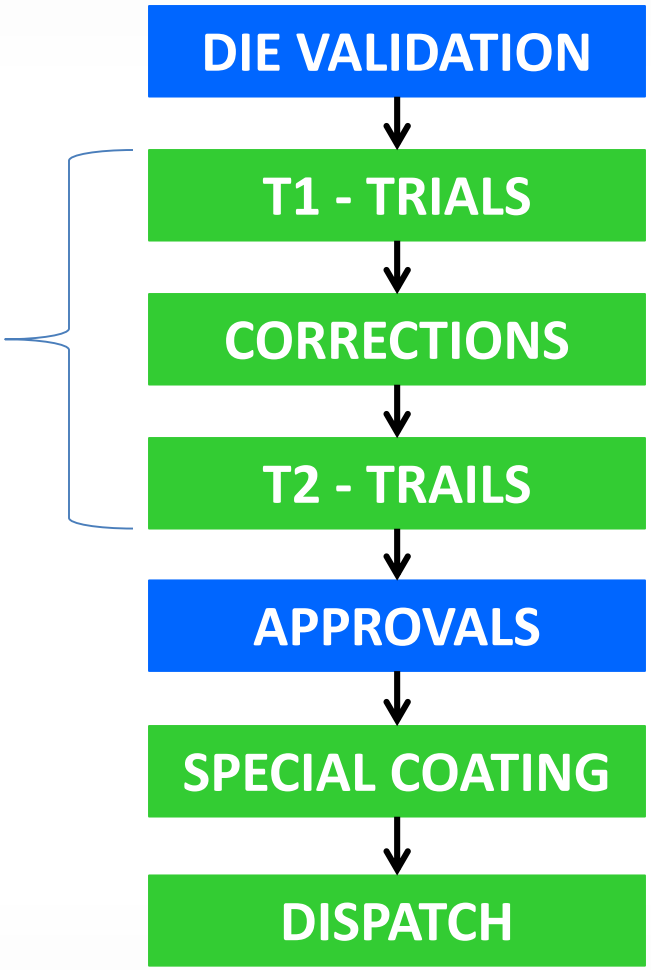
CUSTOMER

3D CONCEPT TOOLING

2 – Manufacture Phase



3 – Validate Phase



First sample part produced, thoroughly inspected for dimensional accuracy, material homogeneity and defects

After approval of the trial part special coatings if any are applied onto the die, the die is neatly packed and dispatched

CUSTOMER

3D CONCEPT TOOLING

Lead Times

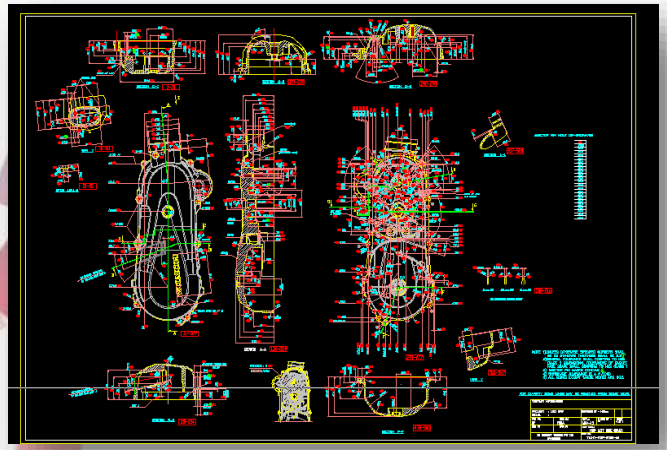
TYPE (Metric Ton) *	TIME (Weeks)
120 t - 400 t	6 Weeks
400 t - 750 t	8 Weeks
750 t - 1200 t	10 Weeks
Above 1200 t	14 Weeks

* 1 t = 1000 kg = 2204.6 lb

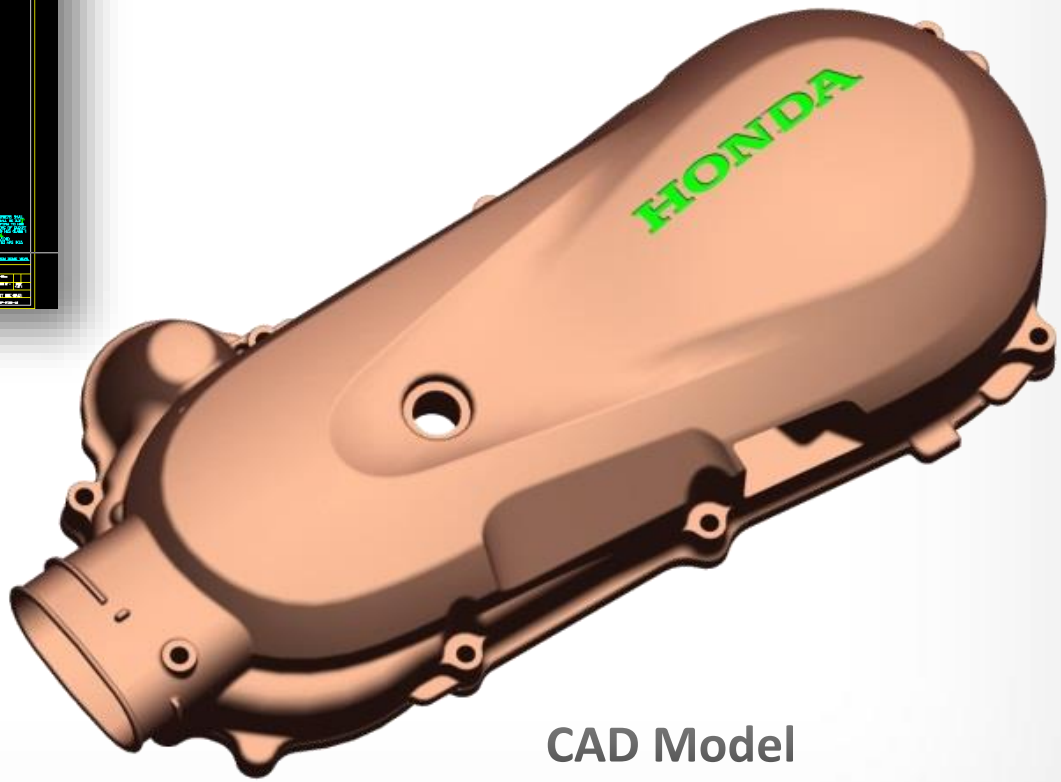
- Above time is from ‘Purchase order’ to ‘ T1 - first trial’
- The times indicated are based on average prior experience
- Times are subject to change based on the complexity
- Custom treatments / requirements will be additional
- Project plan of each die will have exact time + breakup

Case Study *

1 – Design Phase



Drawings



CAD Model

Quote

#SB-44, 1st Cross, 1st Stage,
Industrial Estate, Peenya,
Bangalore - 560 058. INDIA
Tel : 91-80-28390944
Fax : 91-80-41272427
E-mail : 3dconcepts@vsnl.net
www.3dconcepttooling.com

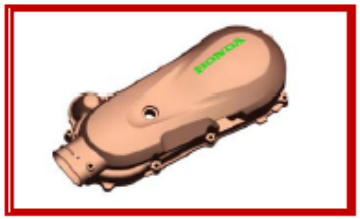
3D CONCEPT TOOLING PVT. LTD.

MANUFACTURERS OF PDC, LPDC & GDC DIES

Customer	HONDA MOTORS
Ref No	3DC - HMSI - 071
Date	08.07.2010

To,
M/s HONDA MOTORS INDIA LIMITED.
INDIA

Kind attn: Mr. Surinder Singh - Purchase Head
Sub: Single cavity PDC die for LSC KWP COMPONENT



Dear sir,

Thank you for showing intrest and confidance in 3DC, Here with we are pleased in offering our best quote for Design Manufacture and supply of the Single cavity PDC die as per your 3D CAD model.

Sl No	DESCRIPTION	RATE PER UNIT	QUANTITY	PRICE
1	DESIGN - MANUFACTURE - SUPPLY OF SINGLE CAVITY PDC DIE FOR LEFT SIDE COVER FOR KWP MODEL - DIE No.15 (Rupees Fifty one lakhs sixty thousand only)	51,60,000.00	01 SET	51,60,000.00

Terms and conditions :

1. 50% Advance along with technically & commercially confirmed PO.
2. 40% after submission of the Trial 0 component.
3. 10% plus duties and taxes against proforma invoice before the dispatch.
4. Packing & forwarding will be charged at actuals.
5. 2D & 3D data to be provided by M/s Honda India Limited
6. Delivery commitment of 8 weeks from the date of PO receieved.

for 3D CONCEPT TOOLING Pvt Ltd.

08.07.2010
C.Ravi chandran
Managing director

DIE & MOULD SOLUTIONS UNDER ONE ROOF

Quote

C.RAVICHANDRAN

Date	08.07.2010	No of cavity	1		
		Hyd core	2		
Component name:	[illegible]	Mec core	0	Part Number	[illegible]
		M/c Tonnage	750 T		
Customer:	HONDA MOTORS INDIA	Die size	885x745x710	Contact	[illegible]

Material cost

Description	Material	Size (L X W X H)			Size (Dia X H)		Wt (Kg)		Cost / unit	QTY	Total cost (Rs)
		Length(mm)	Height(mm)	Width(mm)	Diameter(mm)	Height (mm)	Bar	Round			
FD insert	ORVAR	620	360	170			303.552	0	650	1	197308.80
MD Insert	ORVAR	620	360	190			339.264	0	650	1	220521.60
CORE PIN MD					0	0	0	0	0	1	0.00
CORE PIN FD					0	0	0	0	0	1	0.00
Sidecore3							0	0			0.00
Guide Rail							0	0			0.00
Wear Plate							0	0			0.00
Wedge							0	0			0.00
Spruebush					0	0	0	0	650	1	0.00
Spreader					170	150	0	26.5432	650	1	17253.08
ChillVent							0	0			0.00
IntegralShot Sleeve							0	0			0.00
Loaclised Core							0	0			0.00
Loose Inserts							0	0			0.00
Electrode							150	0	800	1	120000.00
									Total material cost		555083.48

Estimated by:

Approved by:

Quote

C.RAVICHANDRAN

Date	08.07.2010	No of cavity	1		0
		Hyd core	2		
Component name:	[illegible]	Mec core	0	part name	[illegible]
		M/c Tonnage	750 T		
Customer:	HONDA MOTORS INDIA	Die size	885x745x710	Contact	Mr. Surinder singh

Standard items

Description	Make / Brand	Qty	Unit price	Total cost	
EjectorPin	Indian	114	400	45600.00	
CorePin	In house	60	1250	75000.00	
Fasteners	Bought out	100	200	20000.00	
Cooling Couplers				0.00	
CoolingAdopters		46	1500	69000.00	
Hyd.Cylinders	SMC	2	45000	90000.00	
Mech.Cores		0	30000	0.00	
Limit Switches	OMRON	4	3000	12000.00	
Bracket&Couplers		2	25000	50000.00	
IntegralShot Sleeve				80000.00	
LatchArrangements				0.00	
Cooling Hose		40	60	2400.00	
Ejector Sleeve				0.00	
COPPER PIPE		15	75	1125.00	
CoolingManifold	In house	2	2500	5000.00	
Spl Toolings	In house			0.00	
CHILL VENT	In house	2	15000	30000.00	
				0.00	
				0.00	
				0.00	
				0.00	
		Total cost		480125.00	

Estimated by:

Approved by:

Quote

C.RAVICHANDRAN

Date	08.07.2010	No of cavity	1		0
		Hyd core	2		
Component name:	[redacted]	Mec core	0	part name	[redacted]
		M/c Tonnage	750 T		
Customer:	[redacted]	Die size	885x745x710	Contact	[redacted]

Manufacturing cost

Operation	Est hours / WT	Rs per Hr / Rs per Kg	QTY	Total cost
Design 3D Model	250	450	1	112500.00
Process Planning	100	250	1	25000.00
CNC Program:Inserts	140	350	1	49000.00
CNC Program:Electrodes	200	350	1	70000.00
CNC Machining:Inserts	540	800	1	432000.00
CNC Machining:Electrodes	270	800	1	216000.00
Conventional Machining	160	200	1	32000.00
Vacuum Heat Treatment(A)	470	300	1	141000.00
Vacuum Heat Treatment(L)	50	200	1	10000.00
Plasma Nitriding	424	200	1	84800.00
EDM Machining	350	350	1	122500.00
Wire EDM	200	450	1	90000.00
Fitting and AssLy.	180	250	1	45000.00
Polishing	75	275	1	20625.00
Trials				150000.00
Flow analysys(Procast)				0.00
Surface Grinding	250	150	1	37500.00
Radial Drilling	160	150	1	24000.00
blue matching	200	300	1	60000.00
alloy charges	200	150	1	30000.00
CMM Inspection	16	1750	2	56000.00
Internal Transport				24000.00
Total manufacturing cost				1831925.00

Mould base cost

Length in cm	Width in c	Height in c	wt in Kg	% wt	Cost / Kg	ratio	wt ratio	Price in Rs
88.5	74.5	70.4	3713.318	0.95	125	1.1	40	1212630.54

Total manufacturing cost	3044555.54

EStimated by:

Approved by:

Quote

C.RAVICHANDRAN

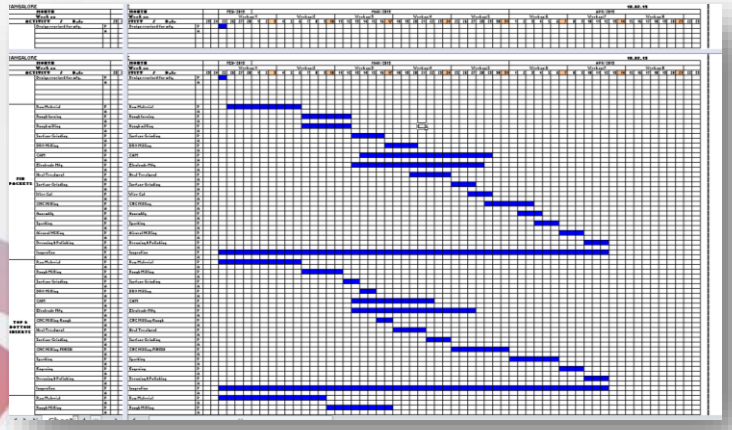
Date	08.07.2010	No of cavity	1		0
Componen	[illegible]	Hyd core	2	part name	[illegible]
Customer:	[illegible]	Mec core	0	Contact	[illegible]
		M/c Tonnage	750 T		
		Die size			

Total material cost in RS	555083.48
Total standards cost in Rs	480125.00
Total manufacturing cost in Rs	3044555.54
10 % overheads in Rs	407976.40
15 % profit in Rs	673161.06
Total cost (Material + Manufacturing + overheads) in Rs	5160901.49

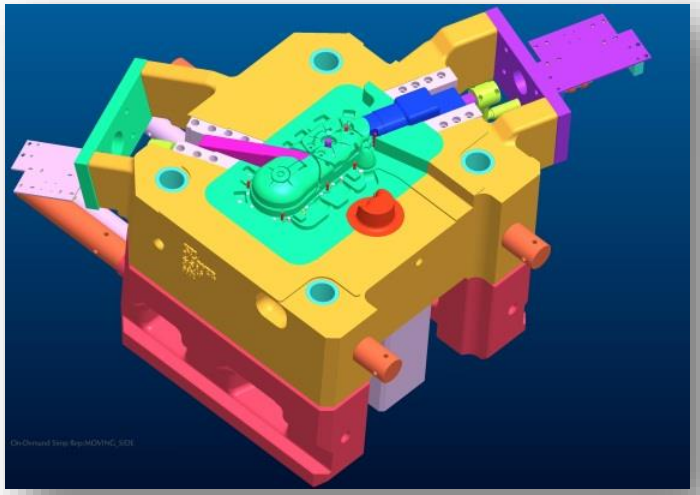
Estimated by:

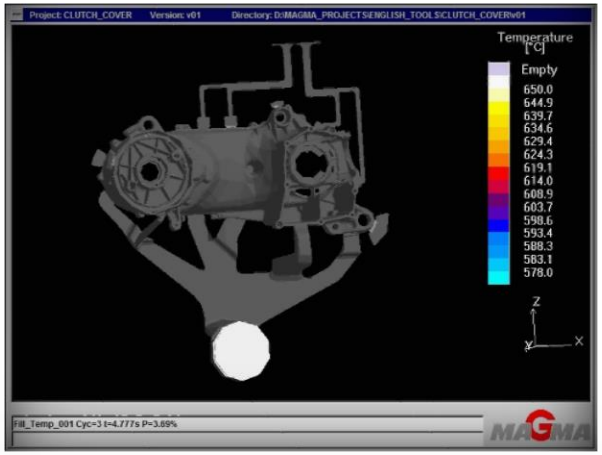
Approved by:

2 – Manufacture Phase

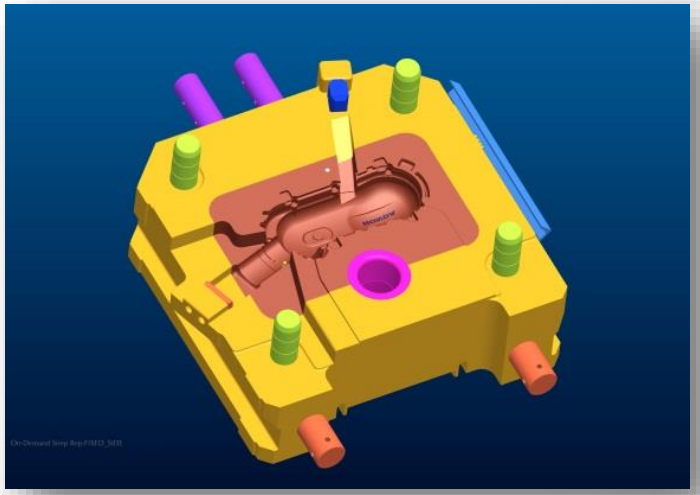


Project Plan





Simulation (Click to Play)



Detailed Design

2 – Manufacture Phase

Machining

Inspection (Die Penetrant Test)

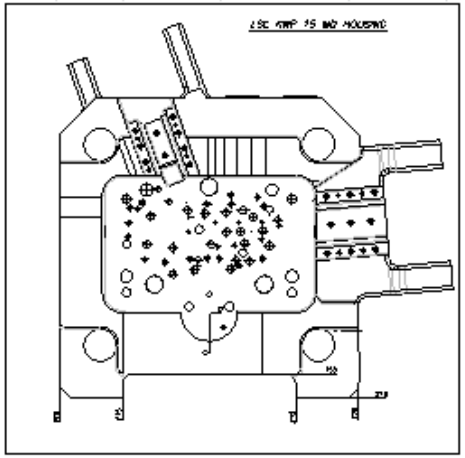
3 – Validate Phase

Die Inspection

L_COVER KVP FD HOUSING INSPECTION REPORT

3D Concept Tooling

Bangalore 03.01.11



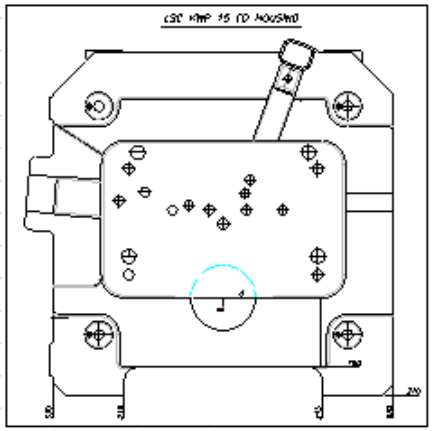
Sl NO	Dim specified	actual	Remarks
1	370	371	
2	215	215.5	
3	215	215.5	
4	370	371	
5	210	212	

Checked by:R.Venkateran

L_COVER KSP MD HOUSING INSPECTION REPORT

3D Concept Tooling

Bangalore 03.01.11

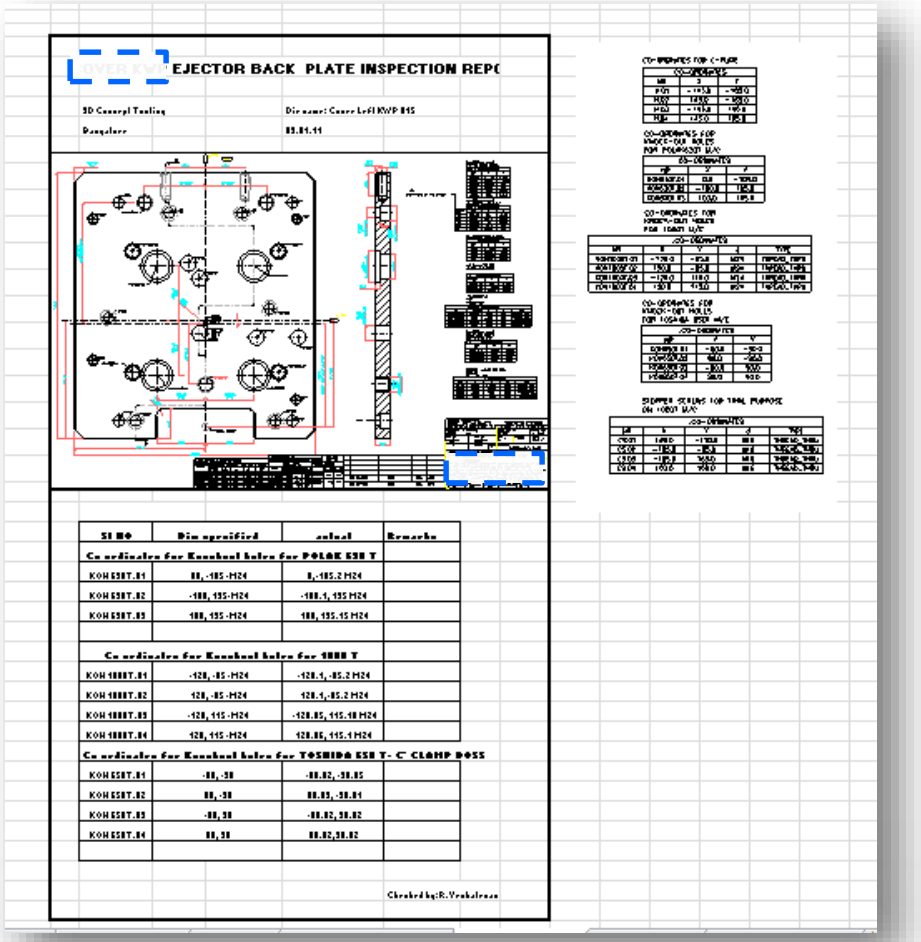


Sl NO	Dim specified	actual	Remarks
1	370	370	
2	215	215	
3	215	215	
4	370	370	
5	210	213	

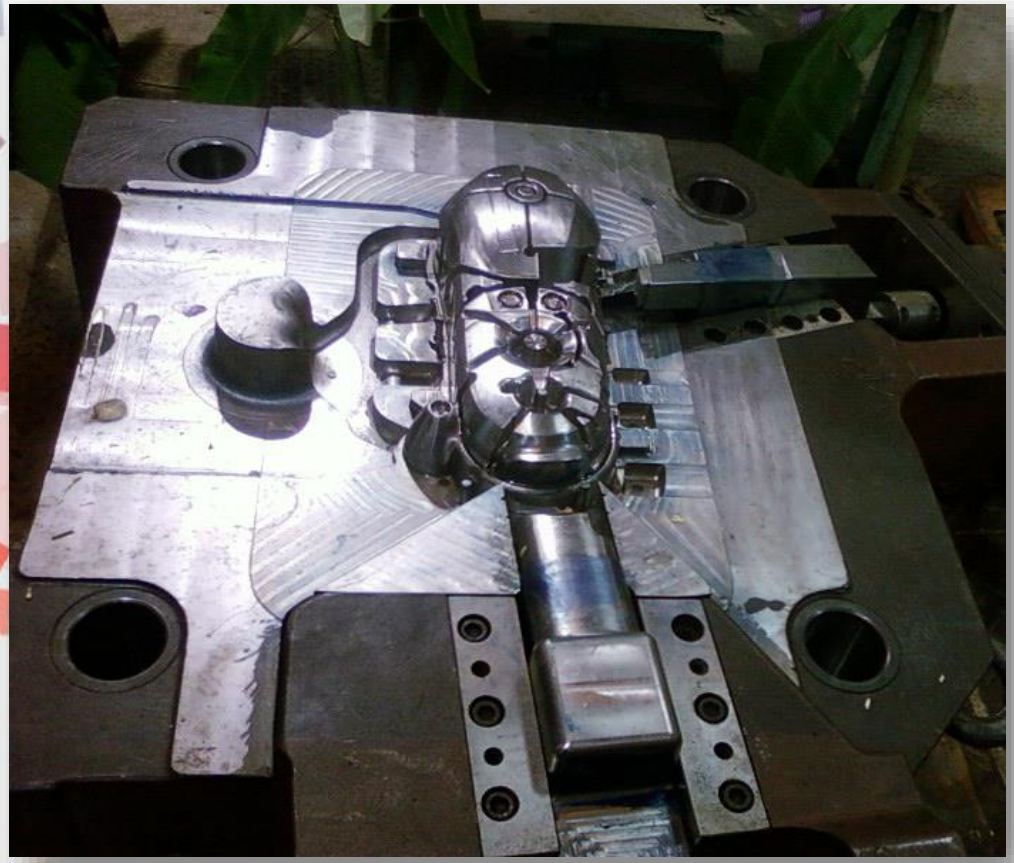
Checked by:R.Venkateran

3 – Validate Phase

Die Inspection – Ejector Back Plate Inspection Report



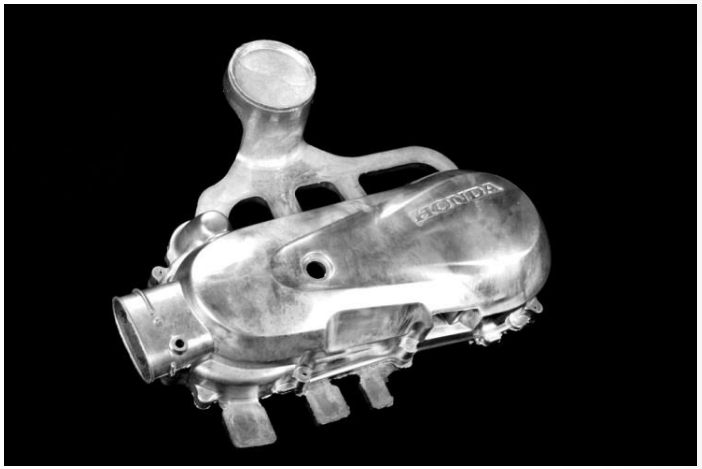
3 – Validate Phase

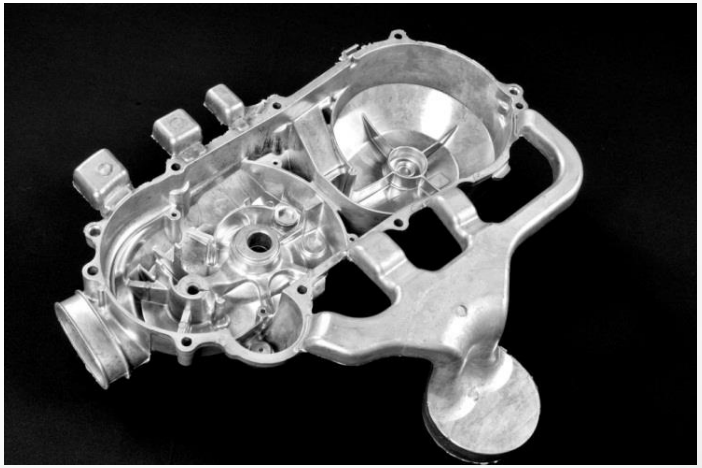


3 – Validate Phase

Die Lifting and Balancing

T1 - Trials





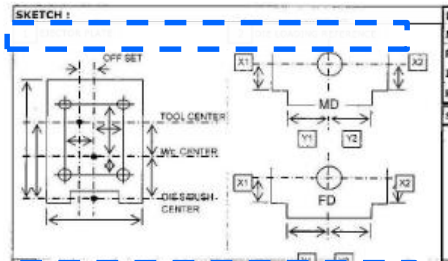
3 – Validate Phase

Die Inspection

HMSI
Die Casting

DIE INSPECTION SHEET

MEDC(D)-F1-0005



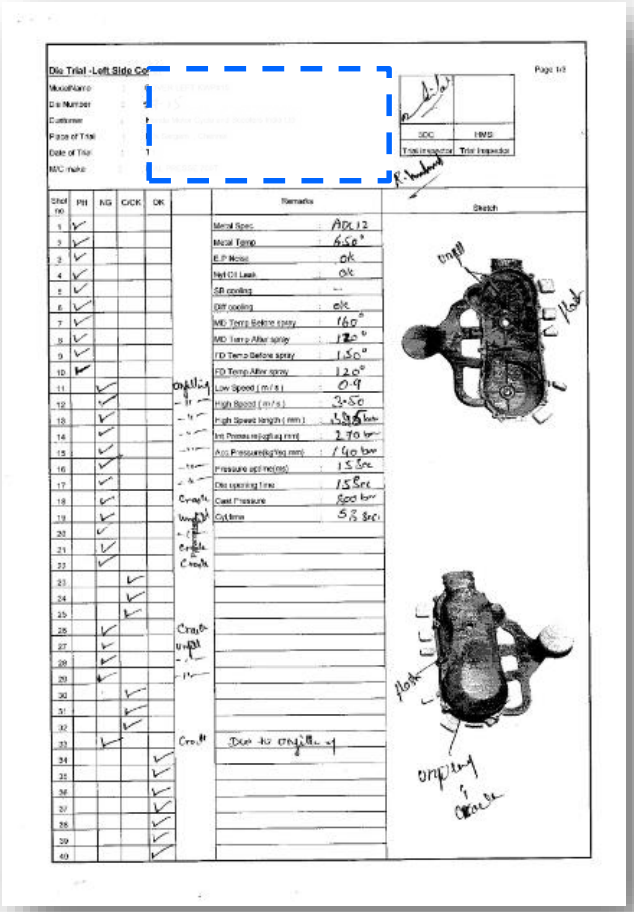
DIE NAME	
MAKER NAME	
PART No.	
INSPECTION DATE	
REVISION DATE	

INSPECTED BY:

S No.	INSPECTION ITEMS	OK/NG	OBSERVATION / INSPECTION RESULTS
1.0	EJECTOR PLATE INSPECTION REPORT OF ALL DIMENSIONS MARKED IN THE SKETCH	*	Report will be Send by 3DC.
1.1	DIE EJECTOR SYSTEM SHOULD MATCH WITH PRODUCTION PDC MACHINE SPECIFICATION.		During Trial Retractable rods used.
1.2	KNOCK OUT SYSTEM / ADOPTOR SYSTEM OR 'C' PLATE SYSTEM.		Adapter System provided.
2.0	DIE LOADING REFERENCE PLATE DIMENTIONS AS PER THE SKETCH.		X (Drg) / X1 / X2 — MD, FD
2.1	DIE LOADING REFERENCE SHOULD MATCH WITH MASS PRODUCTION PDC MACHINE.	*	Report will be Sent by 3DC.
2.2	ALL DIMENSIONS w.r.t SPRUE BUSH CENTER.		Y (Drg) / Y1 / Y2 — MD, FD
3.0	PARALLITY BETWEEN INSERT FACE AND MOULD BASE FACE.		Fd – 0.21 to 0.24
3.1	DIE INSERT SHOULD BE FULL CLAMPED.	OK	Md – 0.23 to 0.26.
3.2	MOULD BASE SHOULD LAYED DOWN ON THE FLOOR.	OK	
3.3	BOTH SURFACE SHOULD BE CLEAN AND DUST FREE.	OK	
4.0	MARKING OF CORE PIN, WATER COOLING UNIT AND EJECTOR PINS AS PER DIE SPECIFICATION SHEET.		ITEM / C/PIN / E/PIN / W/C — CORE PIN: OK; EJECTOR PIN: OK; WATER COOLING: OK; FD INSERT AND BASE: OK OK; MD INSERT AND BASE: OK OK; EJECTOR PLATE
4.1	MARKING SHOULD BE READABLE.		
4.2	MARKING SHOULD BE ENGRAVED.		
5.0	GRUB SCREWS AND SPACER QUALITY REQUIREMENTS.	OK	
5.1	SPACER SHOULD COME OUT ATLEAST 5mm WHEN GRUB SCREW FULL TIGHT.	OK	
5.2	DOUBLE GRUB SCREWS BEHIND EACH SPACER.	OK	
5.3	ALL SPACER LENGTH SHOULD BE SAME.	OK	

3 – Validate Phase

T1 Trial Part Inspection



Conclusion

- Transparent costing – Detailed quotes with breakup
- Dedicated single point customer contact
- Enhanced project management - Bi-Weekly meetings
- Flexibility – Adherence to customer quality requirements
- Shortened delivery times for high priority projects
- High quality standard parts / mould accessories