



INDO-MIM<sup>®</sup>  
COMPLEXITY SIMPLIFIED

## CORPORATE PRESENTATION



# ABOUT US



**85+**

**Material Options**

**24**

**MPIF  
Awards**

**6000+**

**MIM Parts  
Variety**

**650+**

**Customers  
Globally**



**150M+**

**Parts Shipped  
Annually**



**3000+**

**Employees**



**\$200M+**

**Annual Revenue**



# METAL INJECTION MOLDING PLANTS



**Over 8,90,000 sq. ft. of MIM manufacturing in multiple locations in 2 countries**



**Manufacturing Plant – 1  
Hoskote, Bengaluru**



**MIM Manufacturing Plant – 2  
Doddaballapur, Bengaluru**



**MIM Manufacturing Plant – 3  
INDO-MIM Inc., USA**

# INTEGRATED VALUE CHAIN



## One-Stop Solution Provider

**MIM**

**METAL INJECTION  
MOLDING**

Largest installed  
capacity



**CIM**

**CERAMIC INJECTION  
MOLDING**

ISO 9001 and  
ISO 14001 Certified



**IC**

**INVESTMENT  
CASTING**

Temperature and  
Humidity controlled



**PMG**

**PRECISION  
MACHINING**

Aerospace, Oil & Gas,  
Medical



**SURFACE  
TREATMENT**

**SPECIAL  
PROCESSES**

AS9100 & NADCAP  
Approved



**MBJ**

**METAL BINDER JET  
3D PRINTING**

New Addition to  
INDO-MIM



# GLOBAL PRESENCE





# CERTIFICATIONS



 <p><b>CERTIFICATE</b></p> <p>INDO-MIM Private Limited</p> <p><b>AS 9100:2016</b></p> <p><b>AEROSPACE</b></p>	 <p><b>CERTIFICATE</b></p> <p>INDO-MIM PVT. LTD.</p> <p><b>IATF 16949:2016</b></p> <p><b>AUTOMOBILE</b></p>	 <p><b>CERTIFICATE</b></p> <p>INDO-MIM PVT. LTD.</p> <p><b>ISO 13485:2016</b></p> <p><b>MEDICAL</b></p>	 <p><b>CERTIFICATE</b></p> <p>INDO-MIM PRIVATE LIMITED</p> <p><b>ISO 14001:2015</b></p> <p><b>ENVIRONMENT</b></p>	 <p><b>CERTIFICATE</b></p> <p>INDO-MIM PVT. LTD.</p> <p><b>ISO 9001:2015</b></p> <p><b>QMS</b></p>	 <p><b>CERTIFICATE</b></p> <p>ISO CLASS 8</p> <p><b>CLEAN ROOM</b></p>	 <p><b>CERTIFICATE</b></p> <p>INDO-MIM PRIVATE LIMITED</p> <p><b>OHSAS 18001:2007</b></p> <p><b>HEALTH &amp; SAFETY</b></p>	 <p><b>GC-MARK CERTIFICATE</b></p> <p>INDO-MIM PRIVATE LIMITED</p> <p><b>GC-MARK</b></p> <p><b>ENERGY EFFICIENT</b></p>
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# PRODUCT PORTFOLIO



## AUTOMOTIVE

Turbochargers, sensors,  
pumps, seating, door  
mechanism, nozzle,  
etc.



## CONSUMER

Fashion accessory,  
Mountaineering, Lock  
parts, Home appliances,  
Personal care etc.



## DEFENSE

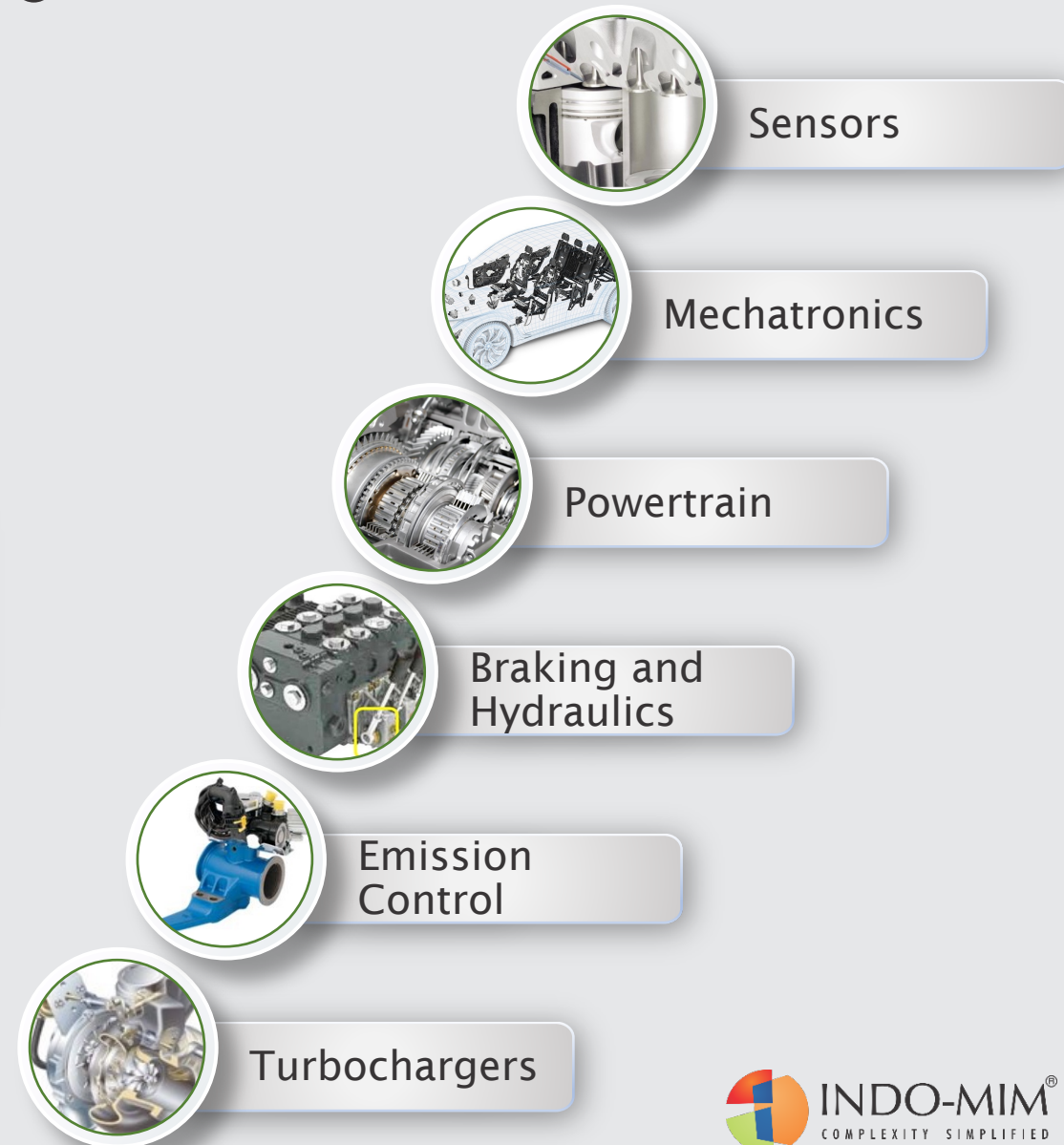
Firearm parts, sights



## AERO & MEDICAL

Surgical parts,  
Staplers, Implants,  
Brackets

# ROADMAP - AUTOMOTIVE



# MARKET DRIVERS - AUTOMOTIVE



## MINIATURIZATION

1. Lower displacement engines
2. Enhanced power requirements without lowering fuel economy



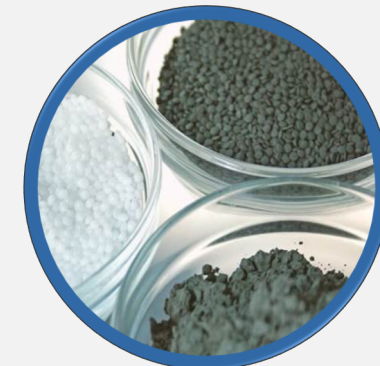
## INTEGRATION

1. Integrated part – no joining operations
2. Weight reduction



## MATERIAL

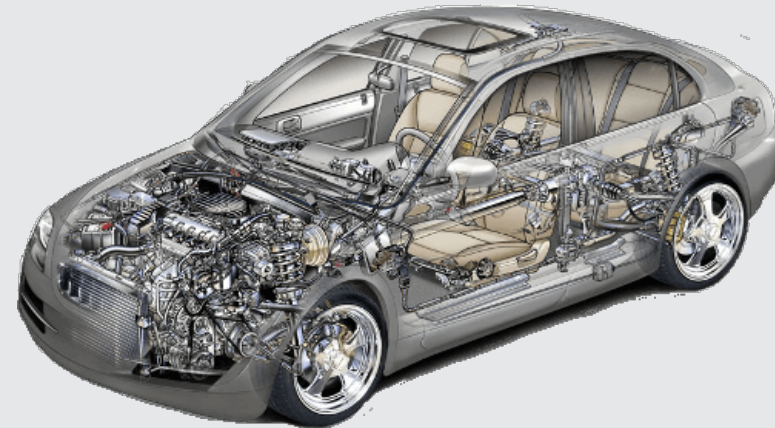
1. Tightening emission standards
2. Superior functionality
3. High temperature, High endurance resistance



**Adding value by contributing to performance enhancement  
via technology innovation to meet OEM requirements**



# CASE STUDIES





# CASE STUDY – PISTON COOLING NOZZLE



## APPLICATION – PISTON COOLING NOZZLE



- Net shape of hole directly formed in MIM even for 0.8 to 1 mm dia.
- No presence of burr.

## SOLUTION

## PRODUCT DESCRIPTION

- Material :- MIM 4605 (Medium Carbon Steel) with Heat treatment
- Weight :- 5g
- Segment :- Automotive
- Annual Required :- 120K



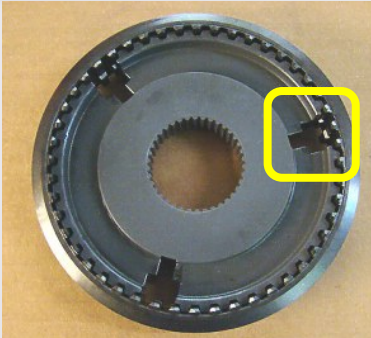
- Inconsistency in machined hole dimension & position.
- Additional problem of burr removal.

## CUSTOMER PAIN POINTS

# CASE STUDY – TRANSMISSION SYSTEM



## APPLICATION – TRANSMISSION SYSTEM



- MIM can offer 98% of the theoretically density, hence higher strength in the components.
- Could be produced in large volume
- Entire profile manufactured through MIM.

## SOLUTION

## PRODUCT DESCRIPTION

- Material :- MIM8620(Low carbon steel with case hardening)
- Weight :- 7g
- Segment :- Automotive
- Annual requirements:- 600K



- Conventionally manufactured through the press and sinter method, Parts have lower strength due to the low density (80%).
- Breakage of parts due to reduced strength.

## CUSTOMER PAIN POINTS

# CASE STUDY – VALVE BRIDGES



## APPLICATION – BRIDGE TO HOLD VALVES



- Manufactured through MIM without any machining
- Coring provided to reduce the weight & improve efficiency

## SOLUTION

## PRODUCT DESCRIPTION

- Material :- MIM 4605 (Medium Carbon Steel) with Heat treatment
- Weight :- 25g
- Segment :- Automotive
- Annual Requirement :- 180K



- Manufacturing through Forging required multiple machining post forging.

## CUSTOMER PAIN POINTS

# CASE STUDY – MIM IN TRANSMISSION SYSTEM



## APPLICATION – TRANSMISSION SYSTEM



- Complete profile is achieved in the tool.
- Could be produced in large volume.

## SOLUTION

## PRODUCT DESCRIPTION

- Material :- MIM 4605 (Medium Carbon Steel)
- Weight :- 11 g
- Segment :- Automotive
- Annual requirements: 140k



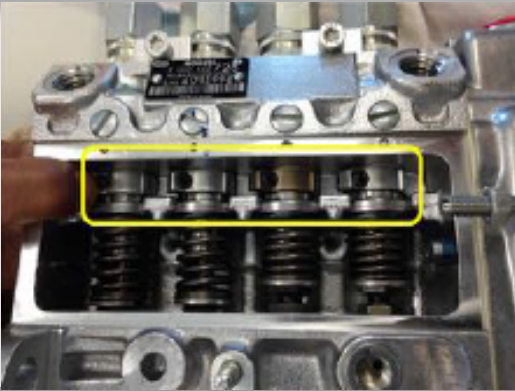
- Oval hole perpendicular to the large diameter hole.
- Complicated profile with chamfer hole.
- Difficult to achieve complete profile in a single operation.

## CUSTOMER PAIN POINTS

# CASE STUDY – FUEL PUMP ACTUATION



## APPLICATION – FUEL ACTUATION



- Entire profile manufactured through MIM.
- Large batch production with auto rewinding mechanism for thread in tool.

## SOLUTION

## PRODUCT DESCRIPTION

- Material :- MIM 4605 (Medium Carbon Steel)
- Weight :- 9g
- Segment :- Automotive
- Annual Requirement :- 3600K



- 6 separate machining operations for every part.
- Problem faced in repeatability and burr formation.
- High machining cost.

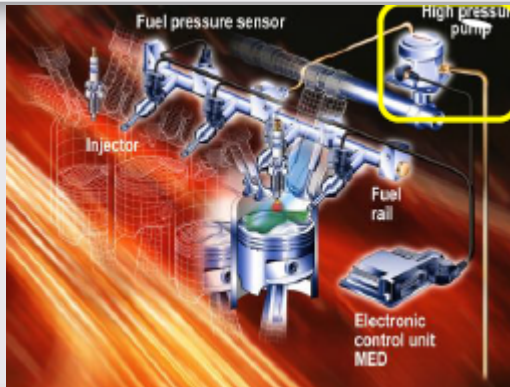
## CUSTOMER PAIN POINTS



# CASE STUDY – GDI PUMP ASSEMBLY



## APPLICATION – GDI PUMP ASSEMBLY



- Internal geometry without burrs achieved through MIM tooling mechanism
- Large batch output with high repeatability

## SOLUTION



## PRODUCT DESCRIPTION

- Material :- SS 440 C (Stainless Steel)
- Weight :- 4g
- Segment :- Automotive
- Annual Requirement :- 300K



- Complicated internal profile for conventional process
- Very large quantity requirement

## CUSTOMER PAIN POINTS

# CASE STUDY – PIN ASSEMBLY



## APPLICATION – 2 WHEELER STARTER SYSTEM



- Integral design from MIM eliminated joining operation.
- Custom material developed in MIM provided higher strength.

## SOLUTION

## PRODUCT DESCRIPTION

- Material :- S7 (Tool grade steel)
- Weight :-2g
- Segment :- Automotive
- Annual Requirement :- 60K



- Pin press fit to sleeve.
- Breakage/ejection of pin resulting in field failure.

## CUSTOMER PAIN POINTS

# CASE STUDY – STEEL TOP PLATE



## APPLICATION – SHOCK ABSORBER



- Component manufactured close to net shape, with surface grinding to achieve flatness (10µm) and facing operation to achieve height tolerance.

## SOLUTION

## PRODUCT DESCRIPTION

- Material :- MIM 4605 (Medium Carbon Steel)
- Weight :- 12g
- Segment :- Automotive
- Annual Requirement :- 10K



- Complicated profile with 18 holes of dia. 3.75 mm and 6 thin ribs of 1.5 mm.
- Challenging to fill sections completely in the molding stage.

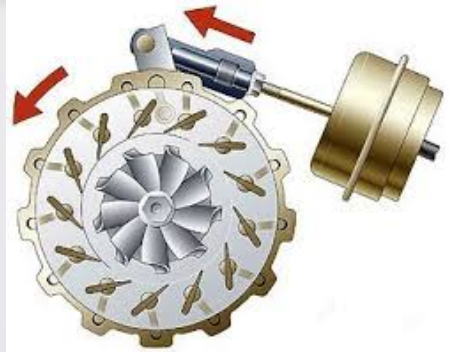
## CUSTOMER PAIN POINTS



# CASE STUDY – VANE LEVER



## APPLICATION – VANE LEVER-TURBOCHARGER

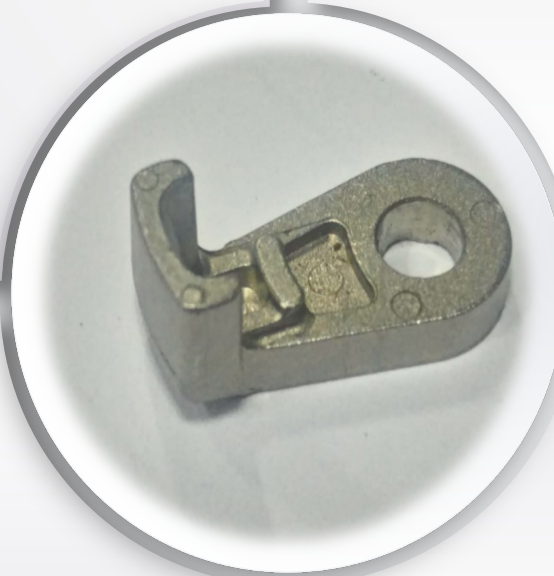


- Near net shape achieved directly from the tool.
- Nitronic 60 proposed for high temperature application.

## SOLUTION

## PRODUCT DESCRIPTION

- Material :- Nitronic 60 (Super Alloy)
- Weight :- 4gm
- Segment :- Automotive
- Annual Requirement :- 330K



- Profile perpendicularity with respect to datum.
- High temperature application.

## CUSTOMER PAIN POINTS

# CASE STUDY – HYDRAULIC PROPORTION VALVES



## APPLICATION – HYDRAULIC PROPORTION VALVES



- Integrated parts without joining operations
- Compact parts with reduction in weight

## SOLUTION

## PRODUCT DESCRIPTION

- Material :- SS 17-4PH and MIM 4605 (medium carbon steel) with heat treatment
- Weight :- 26g to 32g
- Segment :- Automotive
- Annual Requirement :- 360K



- Multiple manufacturing operations
- Joining operations for assembly

## CUSTOMER PAIN POINTS

# CASE STUDY – DECOMPRESSION LEVER



## APPLICATION – DECOMPRESSION LEVER



- Higher strength through MIM even with coring to reduce weight.
- MIM process suited for large batch production.

## SOLUTION

## PRODUCT DESCRIPTION

- Material :- Low Carbon steel with Case Hardening
- Weight :- 22g
- Segment :- Automotive
- Annual Requirement :- 28K



- Sintered part - strength insufficient to withstand application Torque.
- Large quantity requirement.

## CUSTOMER PAIN POINTS

# CASE STUDY – CNG REDUCER



## APPLICATION – CNG REDUCER



This component is a part of sequential CNG reducer

- Net shaped obtained in Molding tool. Avoiding multiple operations like machining, turning
- Capable to produce in large volume.
- Uniform density.

## SOLUTION

## PRODUCT DESCRIPTION

- Material :- MIM4630(Hardened & Tempered Steel)
- Weight :- 8g
- Segment :- Automotive
- Annual Requirement :- 40K



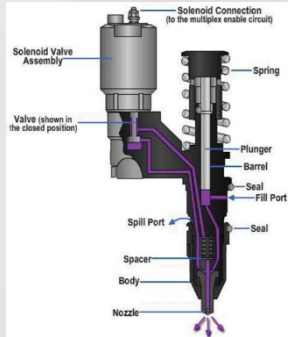
- Difficult to manufacture the curved surface through other conventional process.
- Secondary operations for internal thread.

## CUSTOMER PAIN POINTS

# CASE STUDY – FUEL INJECTION



## APPLICATION – FUEL INJECTION



This part is used as a spacer in the Fuel Injector of heavy duty engine.

- Cost benefit of 50% after migrating to MIM.
- Narrow tolerance of 5 micron flatness and parallelism achieved by double disc fine grinding.
- Indo-MIM has offered XEV- a non magnetic super alloy.

## SOLUTION

## PRODUCT DESCRIPTION

- Material :- MIM XEV(Super Alloy)
- Weight :- 4g
- Segment :- Automotive
- Annual Requirement :- 180K



- Conventional Manufacturing Process – Fine blanking + Machining
- Cost and lead time was more because of multiple operations.
- High temperature application.

## CUSTOMER PAIN POINTS



# CASE STUDY – STARTER MOTOR WEIGHT



## APPLICATION – STARTER MOTOR WEIGHT



- MIM parts attained up to 98% of theoretical density

## SOLUTION

## PRODUCT DESCRIPTION

- Material :- Low Carbon Steel with Case Hardening
- Weight :- 5.5g
- Segment :- Automotive
- Annual Requirement :- 480K



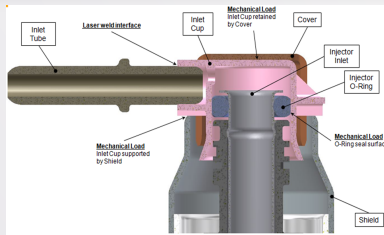
- Insufficient density from conventional press & sinter method

## CUSTOMER PAIN POINTS

# CASE STUDY – REDUCTANT DOSING UNIT



## APPLICATION – EXHAUST SYSTEM



## PRODUCT DESCRIPTION

- Material :- MIM316L
- Weight :- 7g
- Segment :- Automotive
- Annual Requirement :- 1200K



- Migration from machining to MIM eliminating several machining operations
- Good repeatability due to near net shape formation in MIM

- Profile requiring critical machining
- Inconsistency in dimensional accuracy over large quantities

## SOLUTION

## CUSTOMER PAIN POINTS

# CASE STUDY – GEAR ASSEMBLY



## APPLICATION – GEARS FOR SUV DOOR



- Component molded as a single assembly eliminating the joining operation and improving strength.

## SOLUTION

## PRODUCT DESCRIPTION

- Material :- MIM4605(Medium carbon steel)
- Weight :- 14g
- Segment :- Automotive
- Annual Requirement :- 240K



- Gear and pin machined separately and welded to make a single component.
- Welding area prone to fracture due to Torque

## CUSTOMER PAIN POINTS



# CASE STUDY – GEAR ASSEMBLY



## APPLICATION – GEARS FOR SUV DOOR



Parts assemblies in Collapsible roof system of Convertible Car

## PRODUCT DESCRIPTION

- Material :- MIM17-4PH
- Weight :- 34g
- Segment :- Automotive
- Annual Requirement :- 200K



- Full designed for the MIM
- Less Lead time
- Better tolerance control

- Complex Profile, difficult to manufacture through material Removal process.

## SOLUTION

## CUSTOMER PAIN POINTS

# CASE STUDY – COLLAPSABLE ROOF



## APPLICATION – COLLAPSABLE ROOF



Parts assemblies in Collapsible roof system of Convertible Car

## PRODUCT DESCRIPTION

- Material :- MIM17-4PH
- Weight :- 14g
- Segment :- Automotive
- Annual Requirement :- 200K



- Plastic molded over the MIM part for the functionality of mechanism.
- The cost saving is around 30%.
- Solid Film Lubrication coating for better movement of the part.

## SOLUTION

- Strength required for the part with plastic over molding.

## CUSTOMER PAIN POINTS

# CASE STUDY – STEERING MECHANISM SENSOR



## APPLICATION – POWER STEERING UNIT



It is a part of sensor which measures the oil pressure in the power-steering unit

## PRODUCT DESCRIPTION

- Material :- MIM17-4PH
- Weight :- 50g
- Segment :- Automotive
- Annual Requirement :- 250K



- Complicated profile, difficult to achieve in other manufacturing process
- Cracks in the thin wall after the crimping process

- Near net shape gives all the complex profile in tool itself.
- Reproducibility of good parts

## SOLUTION

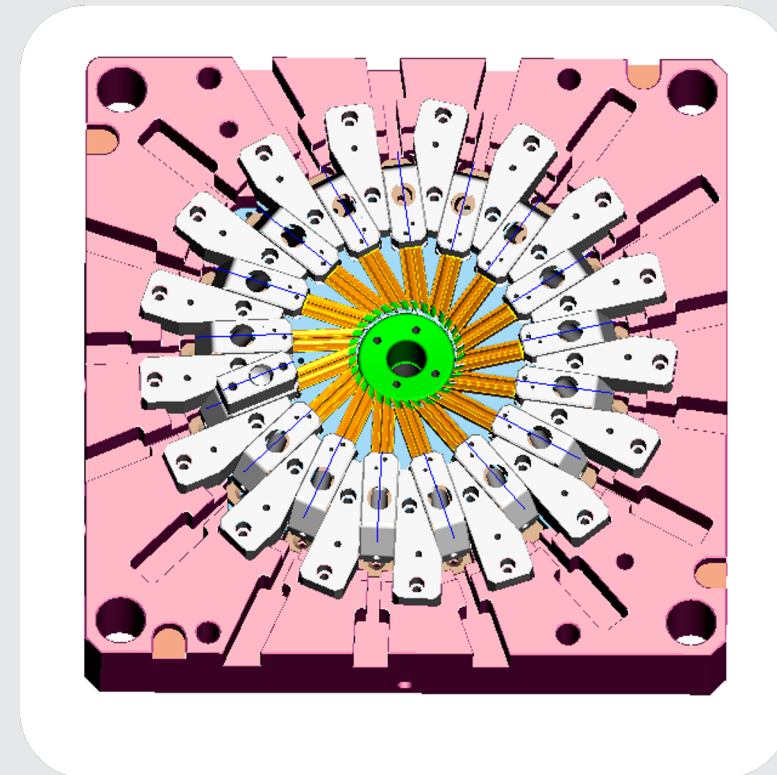
## CUSTOMER PAIN POINTS

# ENGINEERING MILESTONES



Challenge	INDO-MIM solution
17 slides in the tool and Part weight of 160 grams	Tool made with 17 slides in rotary axis and part successfully made in MIM

Market Segment	Automotive
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Pictorial image of Tool Design

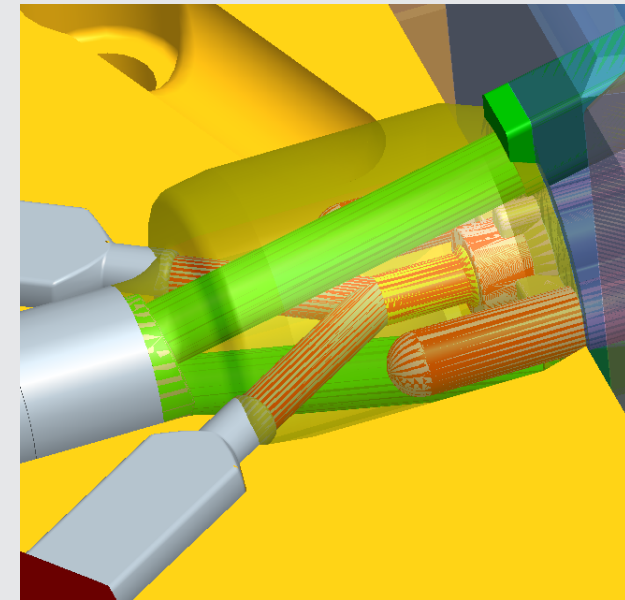
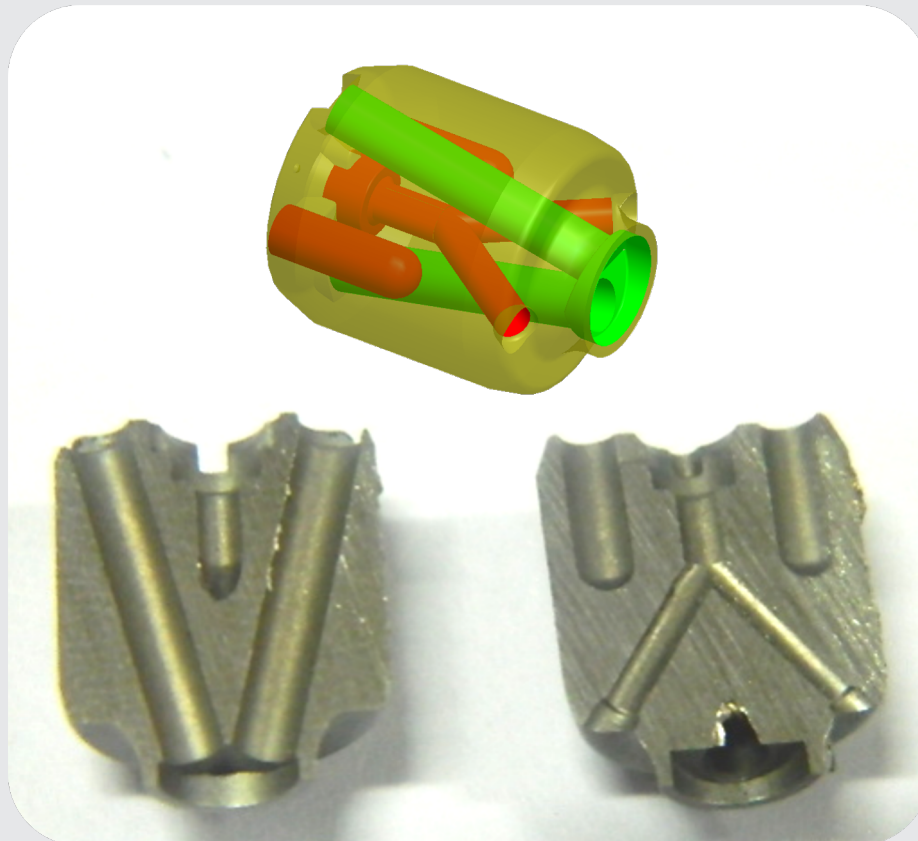
# ENGINEERING MILESTONES



Challenge	INDO-MIM solution
Y junction hole cross section	Tool made with 6 slides for all the cross holes

Market Segment

Automotive



Pictorial image of Tool Design



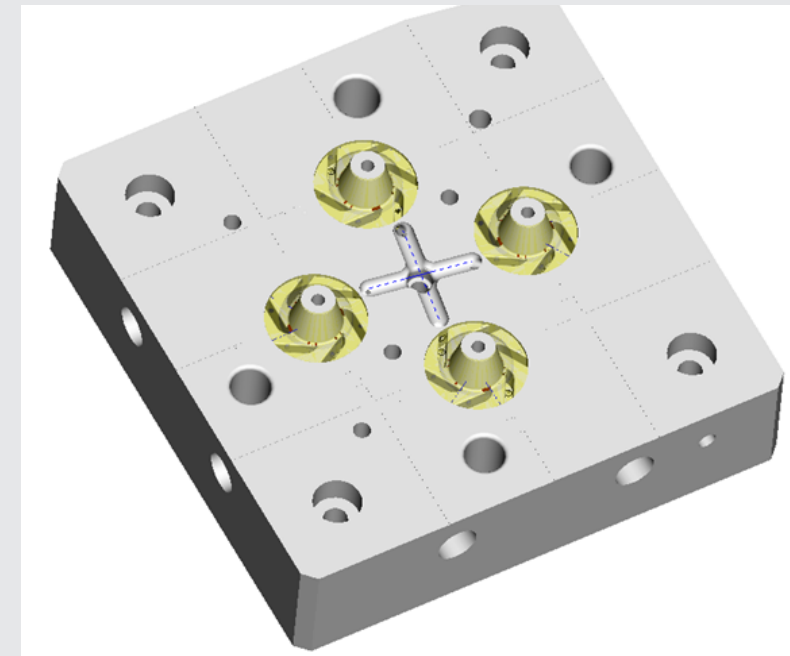
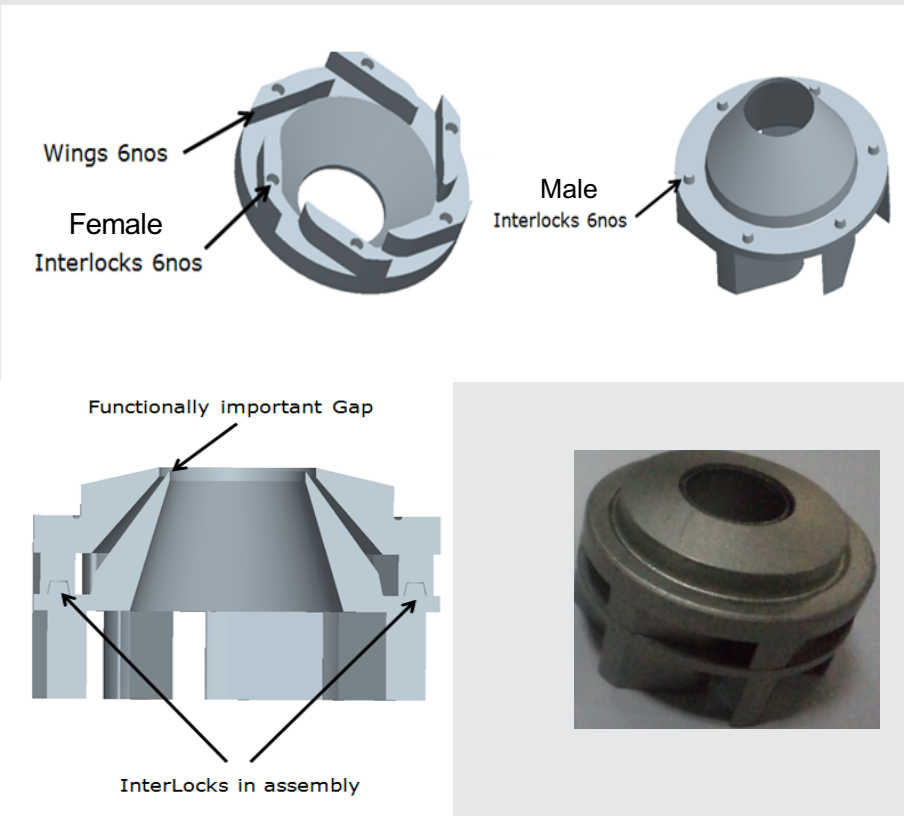
# ENGINEERING MILESTONES



Challenge	INDO-MIM solution
Integration of parts after sintering	Both the parts were molded separately and integrated together before sintering

Market Segment

Automotive



Pictorial image of Tool Design

# ENGINEERING MILESTONES



Challenge	INDO-MIM solution
Part weight was more and had more thickness	By providing coring there was reduction of weight in the part at least by 20% compared to existing process

Market Segment	Automotive
Application	Fork Shift (2 wheeler)



# THANK YOU