

深圳市昌红科技股份有限公司

Shenzhen Changhong Technology Co., Ltd



新技术数字化制造报告

The Report for Digitized Technology applied manufacturing

第一章 数字化 / 自动化应用介绍

Introduction of digitized / automated application

第二章 新技术导入介绍

Introduction of new technology imported

第三章 共同研发优化产品结构

Cooperative design to optimize the product structure

第四章 快速模具应用 (CNC为主的模具加工)

Rapid tooling Technology (CNC-based tooling processing)

2.0. 昌红数字化制造定义

Definition for “digitized technology”



2.1. 以设计为中心的数字化制造技术

Digitized technology applied for design

2.2. 以加工为中心的数字化制造技术

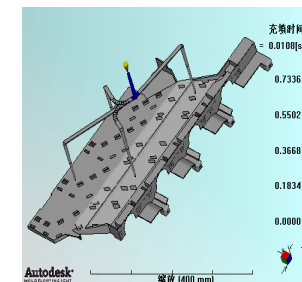
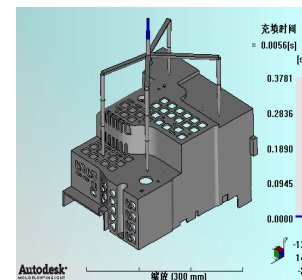
Digitized technology applied for production

2.3. 以管理为中心的数字化制造技术

Digitized technology applied for management

昌红数字化制造 即模具领域设计的模块化、零件的标准化、出图自动化，结合CAD、CAE、CAM、CAPP、PDM、ERP软件的应用，涵括以上三个方面的内容：

Digitized technology applied for tooling includes design modularized, components standardization, automatic output drawing, combined with CAD, CAE, CAM, CAPP, PDM and ERP software.



2. 1. 以设计为中心的数字化制造技术 Digitized technology applied for design

- ❑ 模具设计模块化: 建立3D模具库
- ❑ Mold design modularization: Building 3D mold database

- ❑ 模具零件标准化: 建立配件库
- ❑ Mold components standardization: Building mold parts database

- ❑ 模具出图自动化: 一键式自动出图
- ❑ Automatic output mold drawing: one-click automatic output



❑ 模具设计模块化: 建立3D模具库

❑ Mold design modularization: Building 3D mold database

1.1 通用模具库 Universal Mold database

1.11) 大水口模具库

Side gate Mold database

1.12) 细水口模具库

Pin gate mold database

1.13) 热流道模具库

Hot runner mold database

1.2 Z社模具库 Zebra mold database

1.3 BAP模具库 BAP Mold database

1.4 B社模具库 Brother Mold database

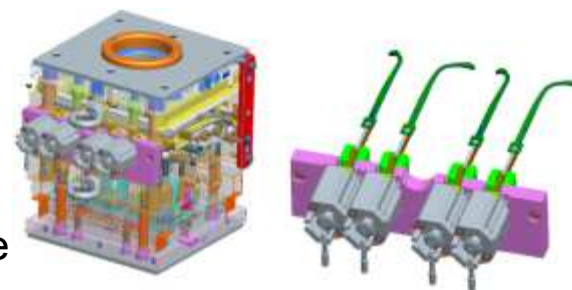
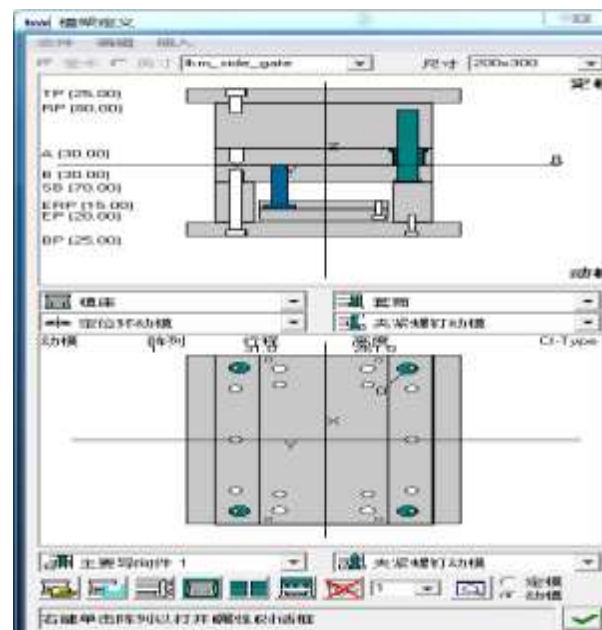
1.5 眼镜系列部品库 glasses series database

1.6 模内切数据库 Mold with gate trimmed automatically database

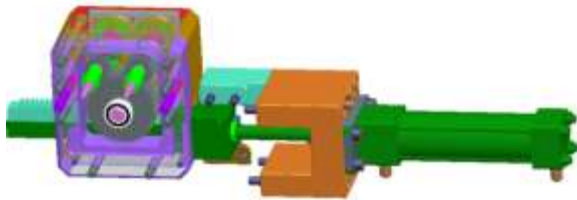
1.7 OA零件模具库 OA Parts Mold database

1.8. 无人机系列部品 UAV series parts database

1.9. 医疗部品模具库 Medical parts mold database



- ❑ 模具零件标准化: **建立配件庫**
- ❑ Mold components standardization: Building mold parts database



2.1 标准和非标行位库 standard and non-standard slider database

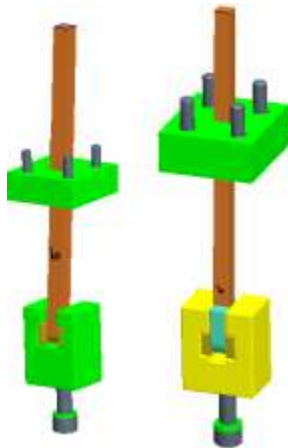
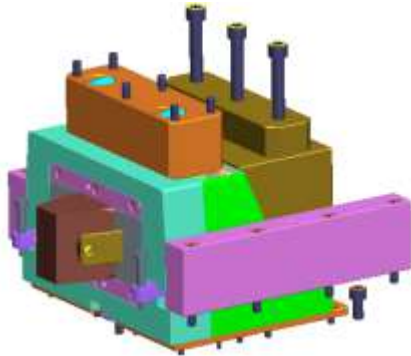
2.2 斜顶库 lifter database

2.3 油缸库 (如Misumi、Taiyo、HPS) Cylinder database (eg. Misumi, Taiyo, HPS)

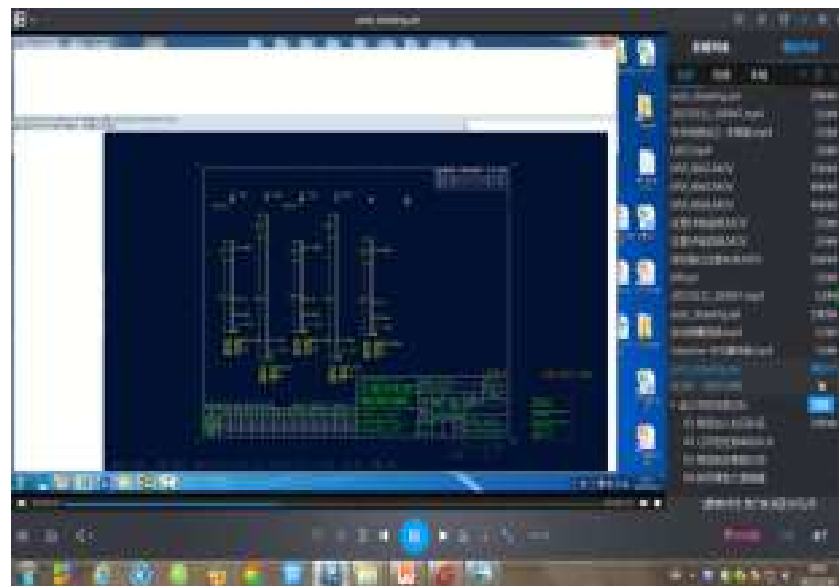
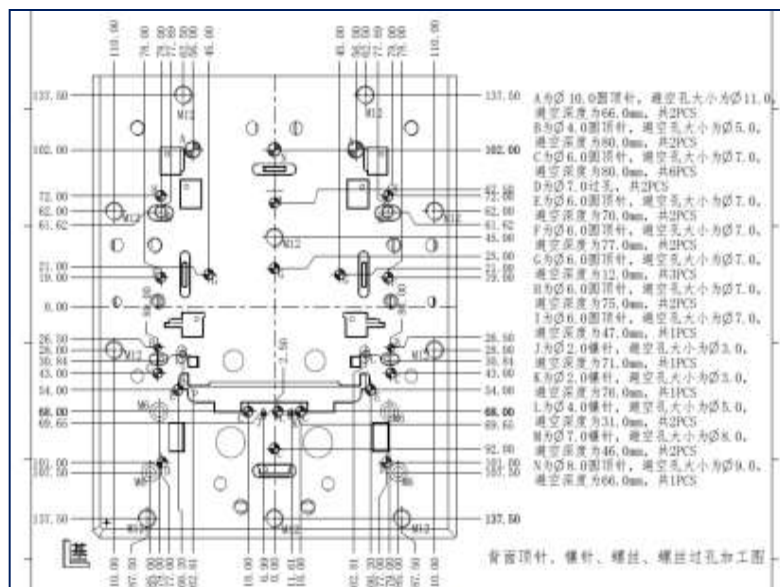
2.4 Harting插头库 Harting connector database

2.5 齿轮齿条抽内螺纹库 gear, rack and inside screws database

2.6 Misumi、Nitto、Pisco、Staubli、DME、HASCO、Strack等常用零件库 General parts database



- ❑ 模具出图自动化：一键式自动出图
- ❑ Automatic output mold drawing : one-click automatic output



2. 2. 以加工为中心的数字化制造技术

Digitized technology applied for production

2011年9月德国引进Robline投产

In September 2011, Robline is introduced from Germany and put into production.





Robline生产线融合了CAD/CAE/CAM/CAPP/PDM/ERP软件的应用, 实施**控制程序化**, **识别自动化**, **编排智能化**, 是以加工为中心的数字化制造高科技技术。

Robline production line Integrated the application of CAD / CAE / CAM / CAPP / PDM / ERP software to implement the control program, automatical identification, and intelligence layout. It is high-tech with process-centered digitization.



技术进度比较 Comparison of technical progress	传统模式 Traditional mode	Robline
机器操作技术员 Machine operation technician	20	3
有效加工效率 Effective machining efficiency	45%-55%	80%-95%
机械加工精度 Machining accuracy	0.010-0.015	0.003-0.005

以加工为中心的 数字化测量 技术

Digitized technology applied for production



昌红科技导入10台ZEISS三次元,
实施离线编程3D自动测量, 测量结果自动评估, 数据自动保存, 报表自动打印。
CHT imported 10 sets of ZEISS 3D measuring equipments to implement programming
3D automatic measurement, automatic evaluation of measured results, data
automatically saved, and reports automatically printed.

2. 3以**管理**为中心的数字化制造技术 Digitized technology applied for management

案例A-注塑车间实施全自动集中化加工管理

Case A-injection workshop implements automatic centralized management



注塑车间实施**全自动集中化** Injection molding workshop implements automatic centralized management.

加工管理，作业员人数下降**29.1%**, Under processing management, the number of operators is decreased by 29.1%.



品质提升**6.9%** Quality is improved by 6.9%

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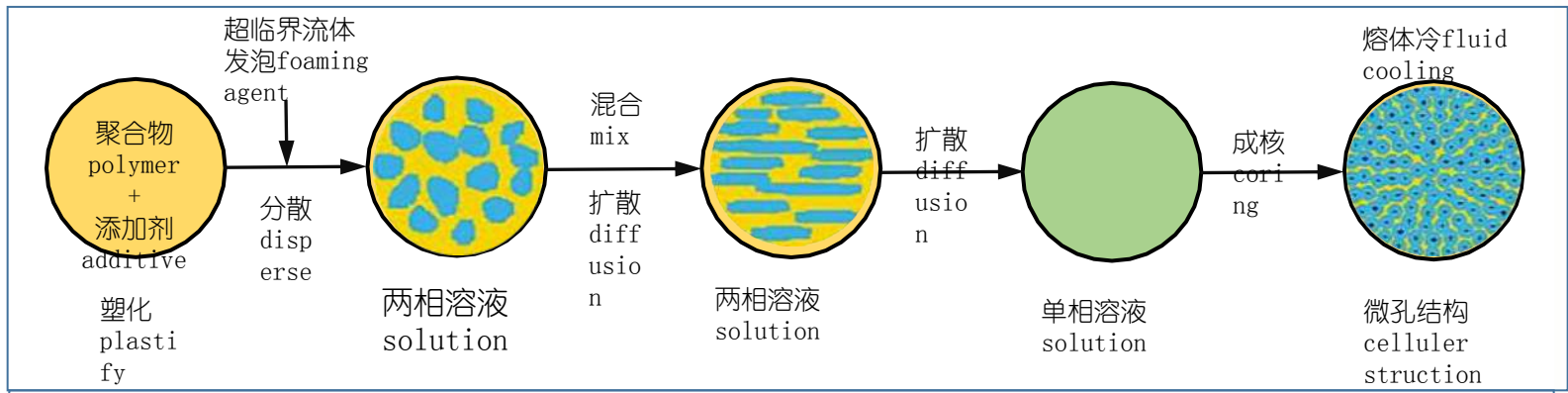
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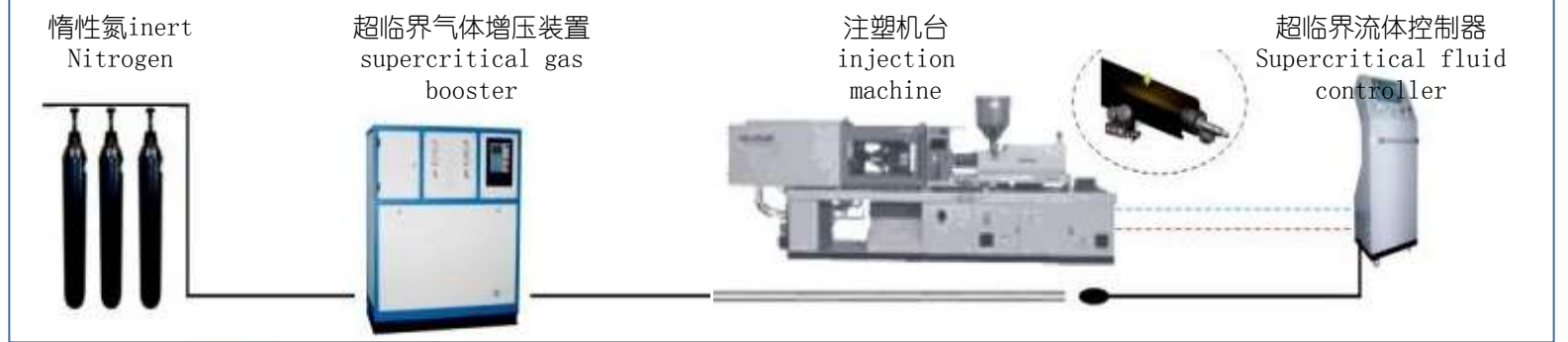
4.0、超临界微发泡注塑成型技术应用

Application of Supercritical Microcellular foam Injection Molding Technology

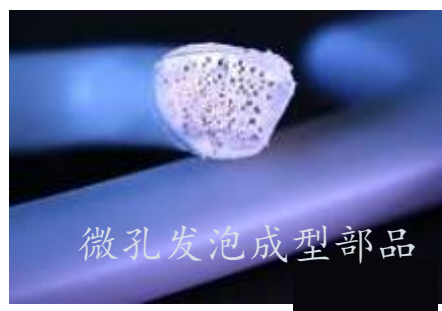
原理



设备



产品



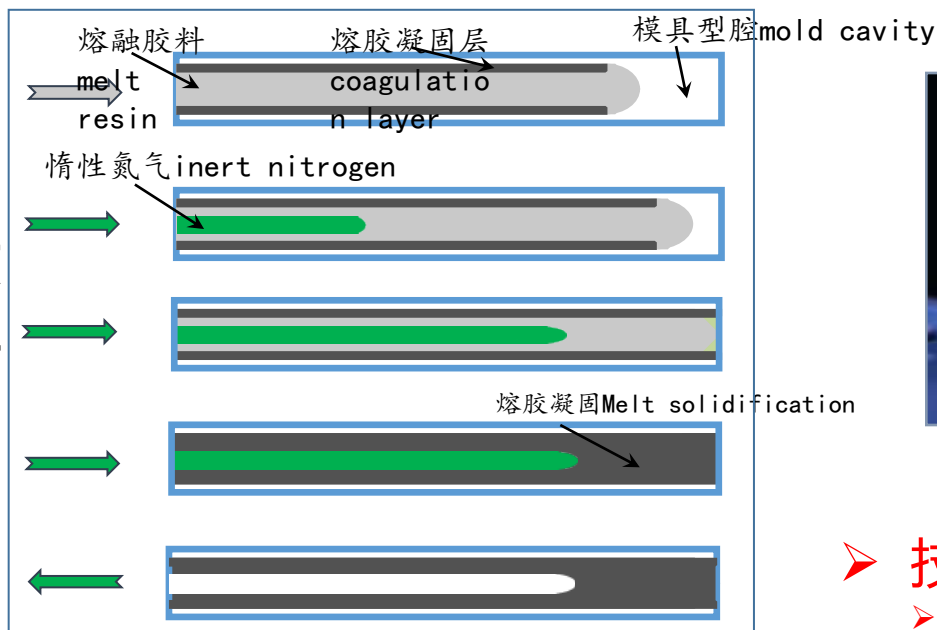
➤ 技术优势： Technical advantage

- 节约原材料，减轻产品重量； Save raw materials, reduce part weight;
- 消除部品表面缩痕，消除变形扭曲； Eliminate shrink marks and deformation of parts;
- 无保压阶段，降低锁模力，节省能源； Remove the pressing holding process, reduce the clamping force, save energy;
- 超临界气体制备简单，成本低廉，无污染。 Supercritical gas preparation is simple withlow cost and pollution.

4. 1. 氮气辅助注塑成型技术应用

Application of nitrogen - aid injection molding technology

原理



产品 part



氮气辅助成型部品

设备

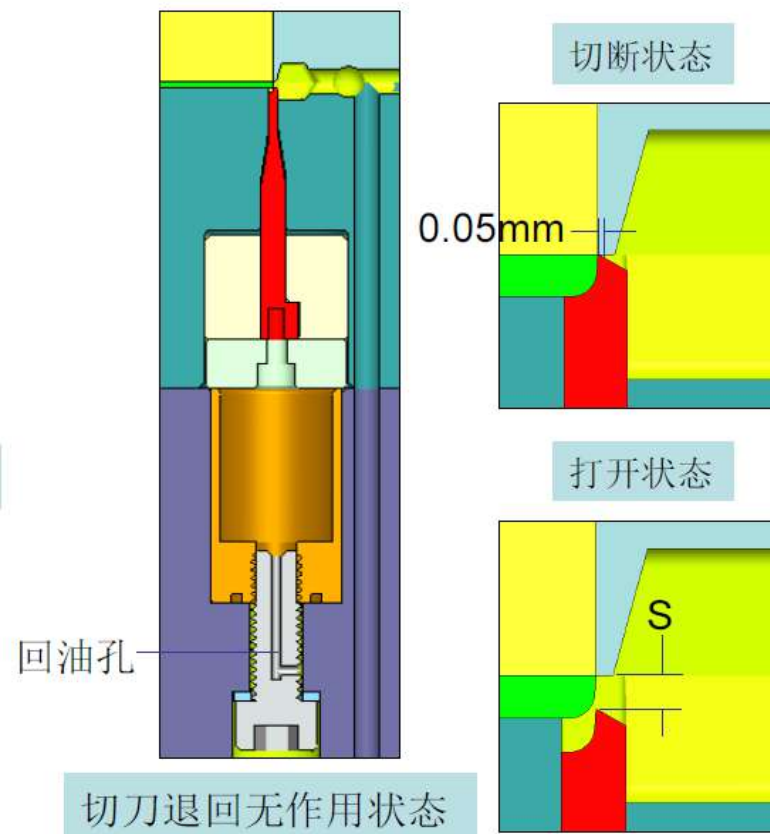


➤ 技术优势: Technical advantage

- **节约原材料, 减轻产品重量;** Save raw materials, reduce part weight;
- **消除部品缩水和变形, 提升品质;** Eliminate parts shrink and deformation, improve quality;
- **可用于成型壁厚差异大的产品;** Can be used for parts with different wall thickness;
- **注塑压力降低, 延长机台寿命。** reduce injection pressure , extend the life of the machine.

4. 2. 模内切自动化工艺

The technology of gate cut inside the tooling



产品切水口后的图片

The picture of parts after cut the gate inside the tool through application of degating in the tool

- **技术优势:** Technical advantage
- **减少注塑二次加工**
Reduce the secondary injection processing
- **提升品质;**
Improve the quality;
- **降低人工成本;**
Reduce labor costs;

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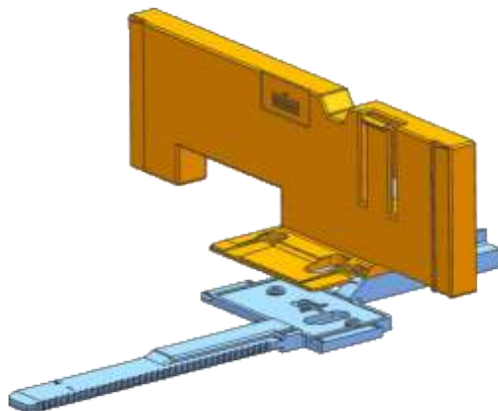
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4.3. 参加客户产品开发共同设计开发 Participate in clients product design

产品结构优化前

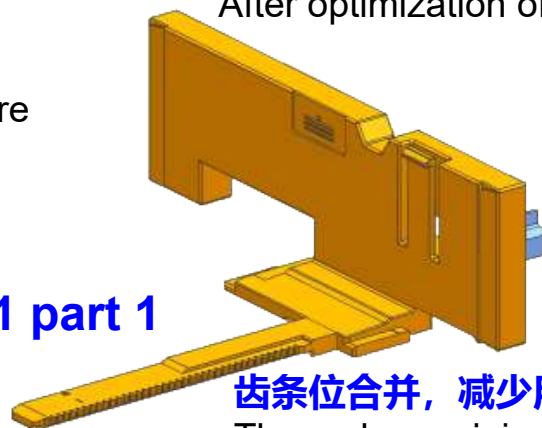
Before optimization of the part structure



零件1 part 1

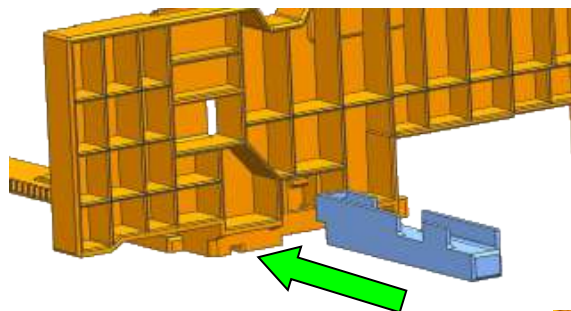
产品结构优化后

After optimization of the part structure



齿条位合并, 减少用螺丝装配

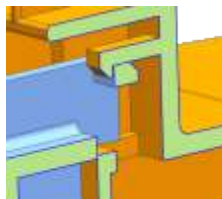
The racks are joined together to reduce the assembly with screws.



零件2 part2

用扣位连接装配

Assemble with buckle connection



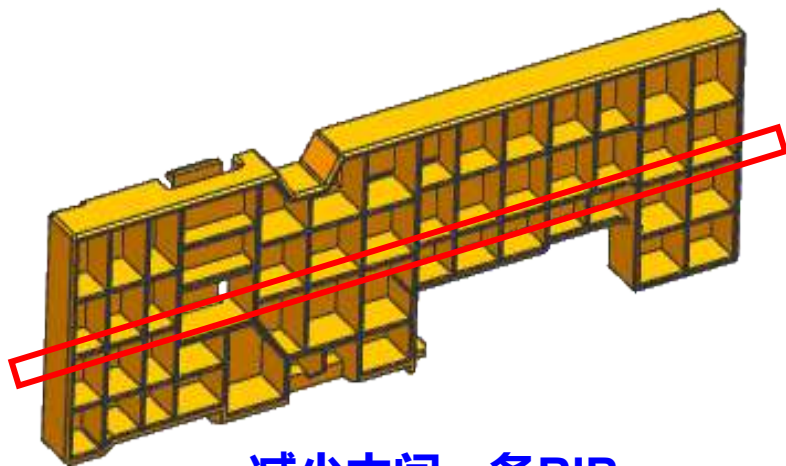
➤ 技术优势: Technical advantages:

- 参与客户产品设计开发产品结构优化
- help design to optimize parts structure
- 降低组装成本 Reduce assembly costs
- 简化了组装工序, 提高组装产能
- Simplify the assembly process, improve assembly capacity

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产品结构优化前

Before optimization of the part structure

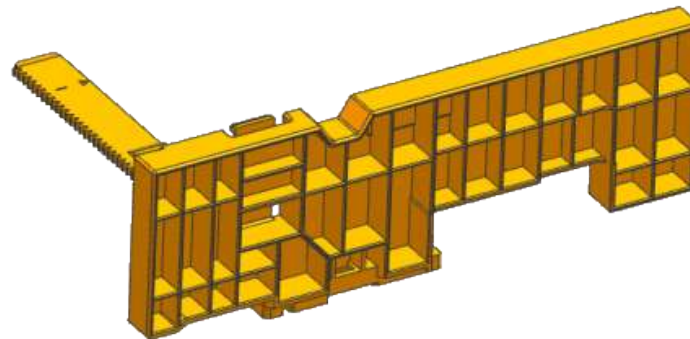


减少中间一条RIB

Cancel the RIB in the mid

产品结构优化后

After optimization of the part structure



减少RIB,减轻重量5.0g

Cancel the RIB, reduce weight by 5.0g

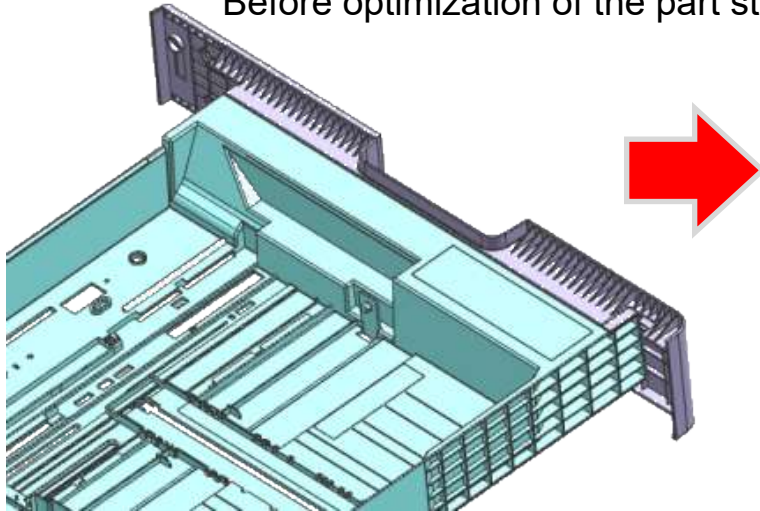
➤ 技术优势: Technical advantages

- 参与客户产品设计开发产品结构优化
- help design to optimize parts structure
- 降低成本 reduce the cost
- 缩短了模具加工工时
- Shorten the mold processing time

4. 3. 参加客户产品开发共同设计开发 Participate in clients product design

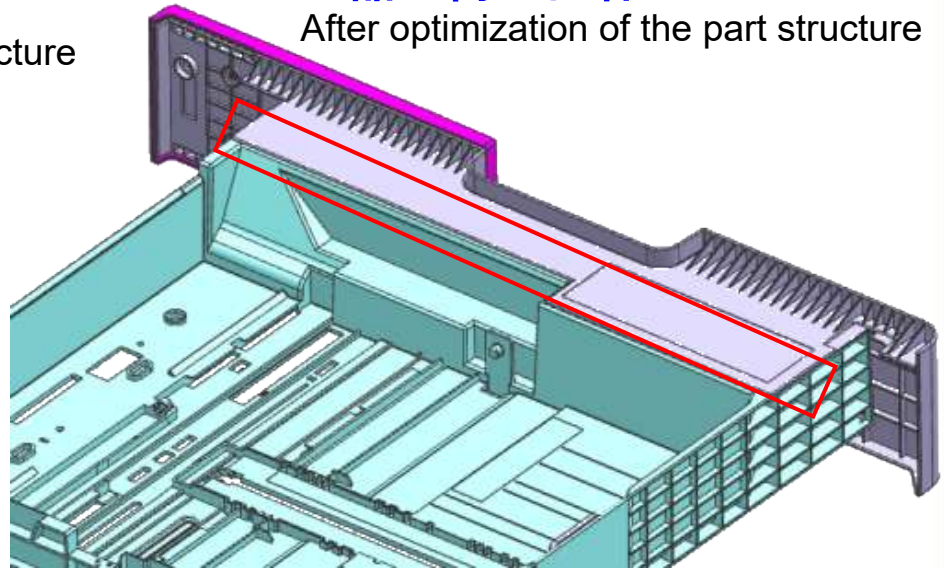
产品结构优化前

Before optimization of the part structure



产品结构优化后

After optimization of the part structure



手柄位与纸盒装配在中间，纸盒模具结构复杂。

Handle is assembled with paper feeder in the middle, and the feeder tooling structure is complex.

手柄位外观面加长与纸盒装配在下面，纸盒模具结构简单。

Handle is lengthened to assemble over the paper feeder, so the feeder tooling structure is simple

结构改良,贴纸位改成贴在手柄壳上,改善纸盒模具结构简化

The label is stuck on the inner shell of handle, which simplify the feeder tooling structure

➤ **技术优势：** Technical advantages

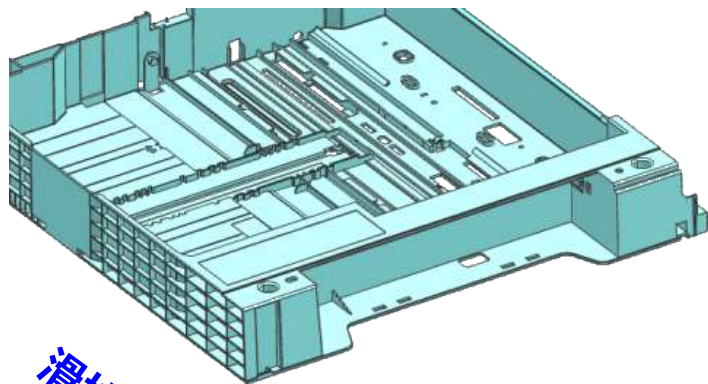
- **参与客户产品设计开发产品结构优化**
- help design to optimize parts structure
- **降低模具加工成本**
- Reduce mold processing cost
- **简化了模具结构，缩短了模具加工日程**
- Simplify the mold structure, shorten the mold processing time

4. 3. 参加客户产品开发共同设计开发

Participate in clients product design

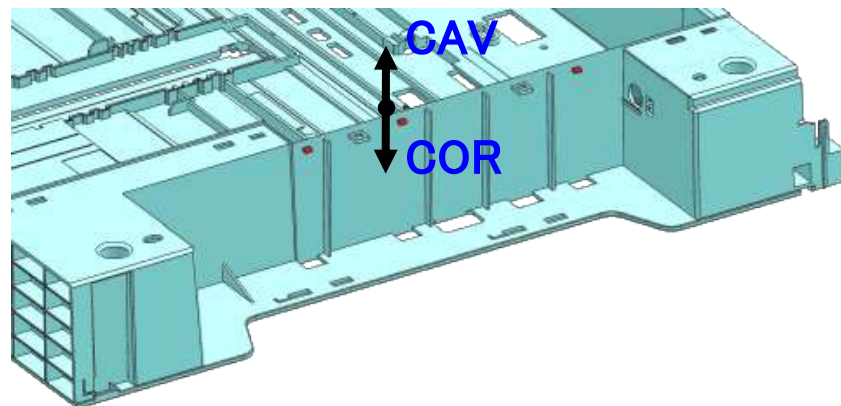
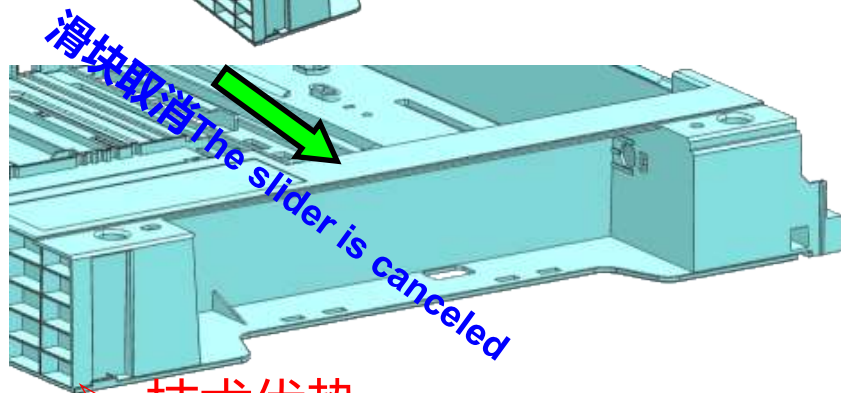
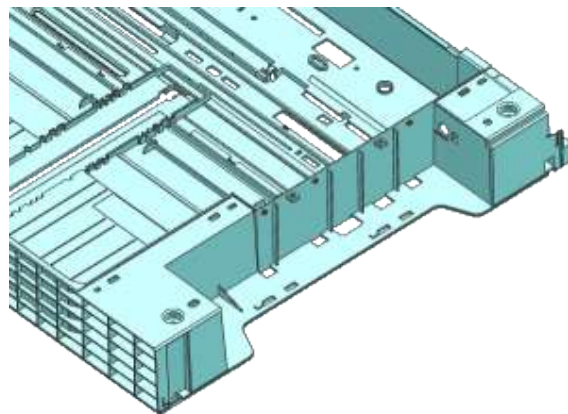
产品结构优化前

Before optimization of the part structure



产品结构优化后

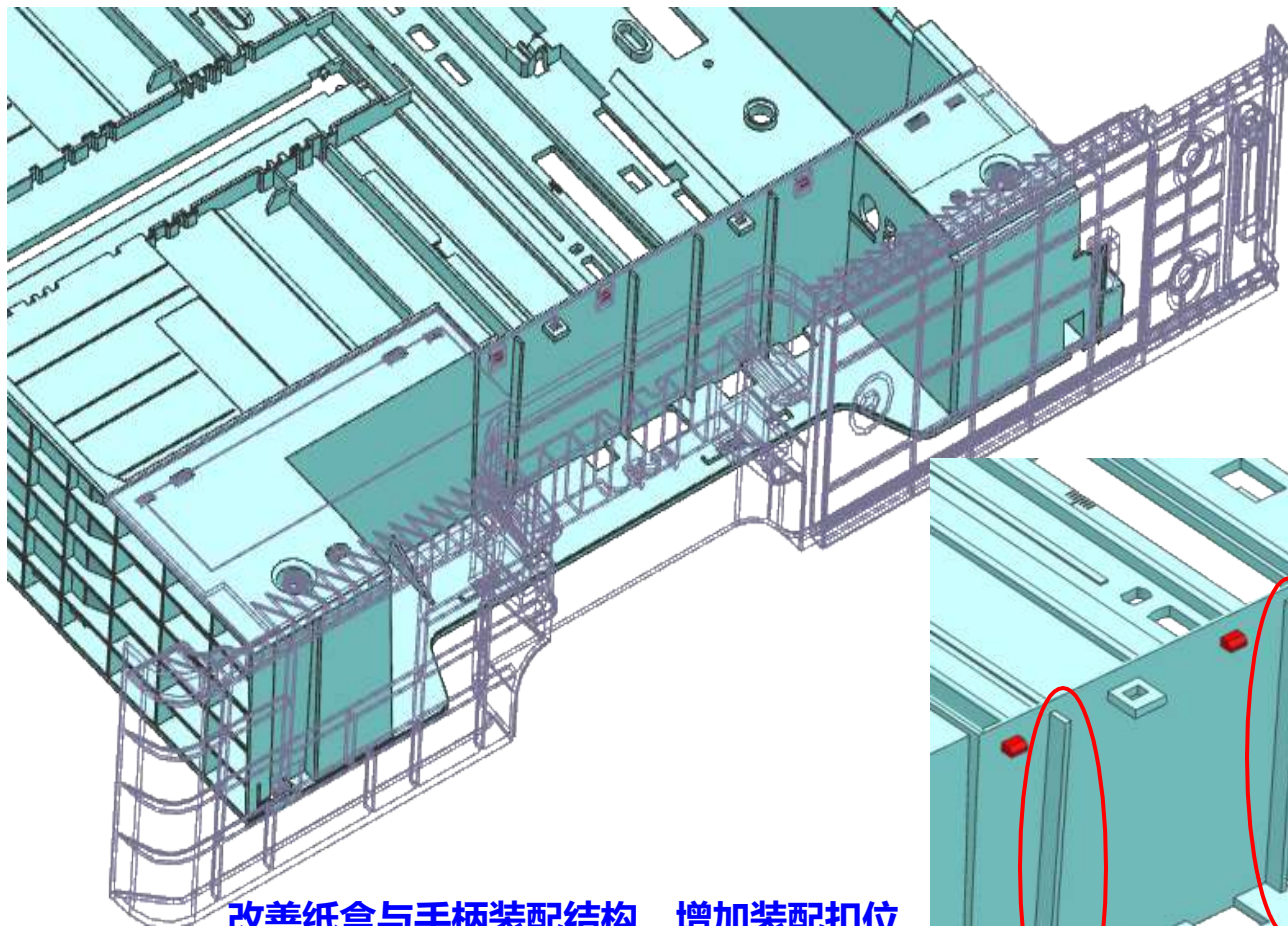
After optimization of the part structure



➤ 技术优势: Technical advantages

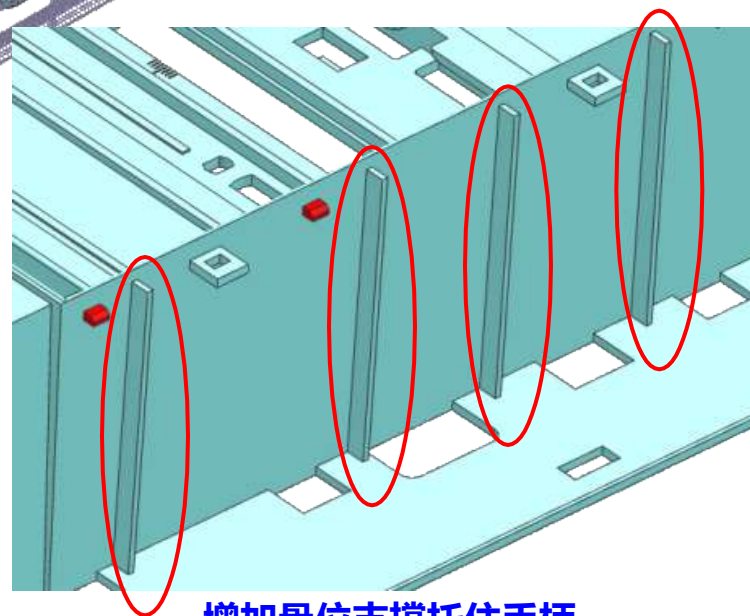
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4. 3. 参加客户产品开发共同设计开发 Participate in clients product design



**改善纸盒与手柄装配结构，增加装配扣位，
装配详图见下页**

Improve the paper feeder and handle assembly structure, add buckles, see next page for the assembly details



**增加骨位支撑托住手柄，
Add ribs to support the handle.**

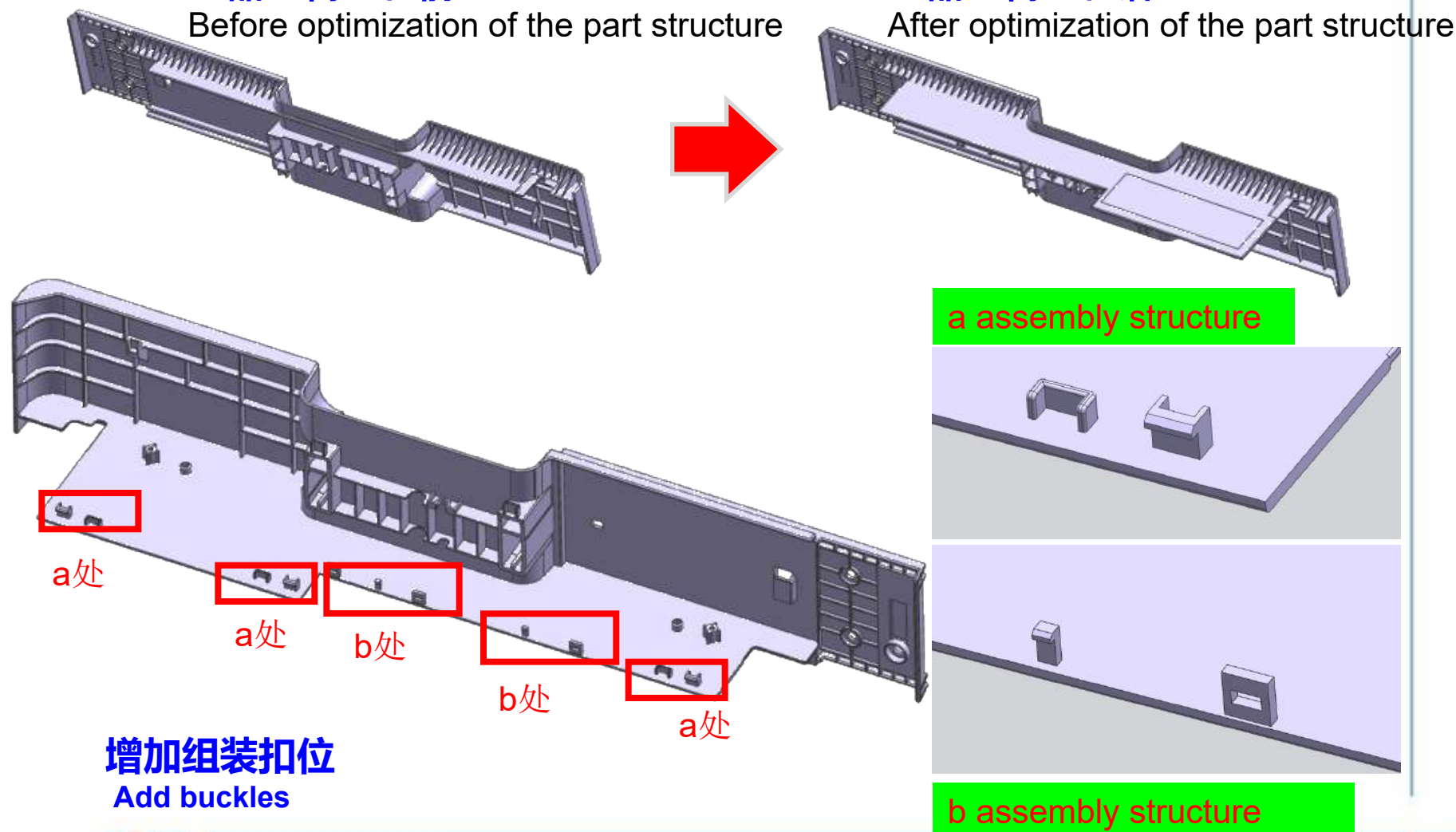
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产品结构优化前

Before optimization of the part structure

产品结构优化后

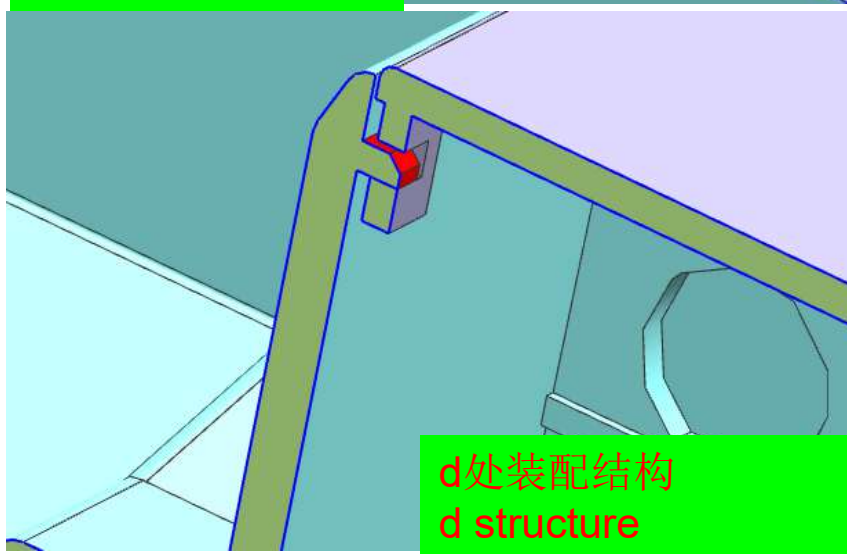
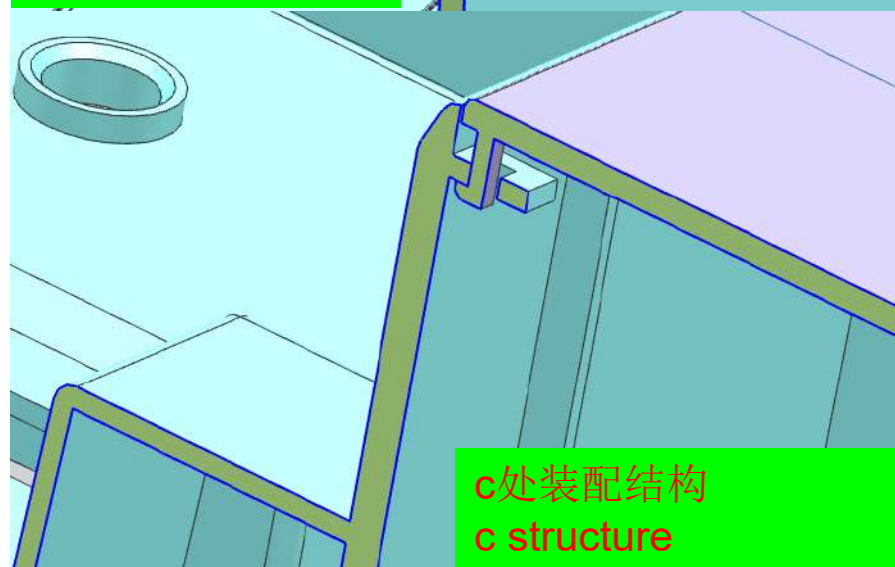
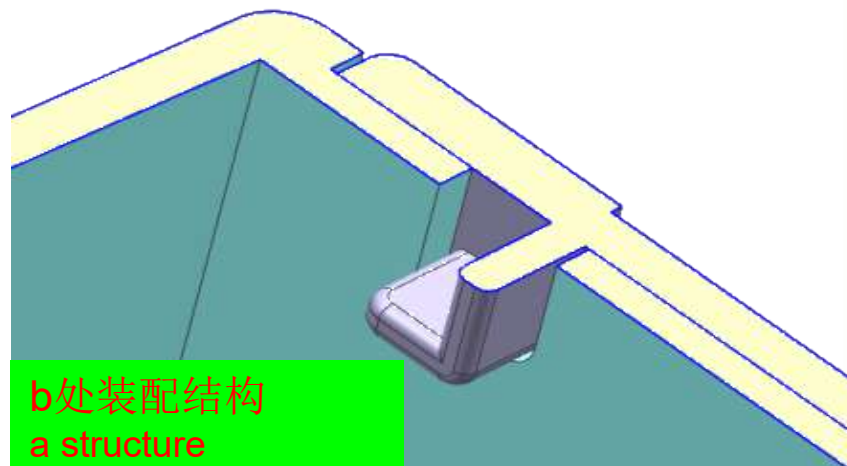
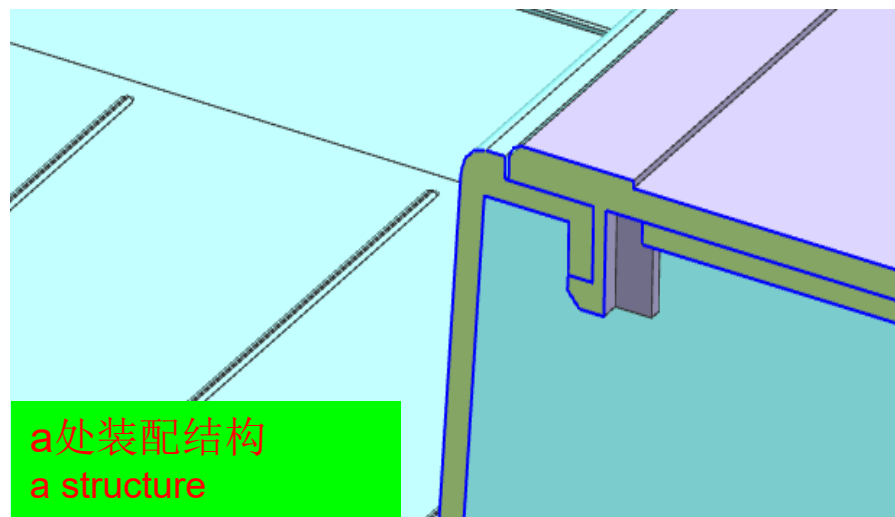
After optimization of the part structure



4. 3. 参加客户产品开发共同设计开发

Participate in clients product design

结构改良,改善装配效果 Assembled result shown after structure improved

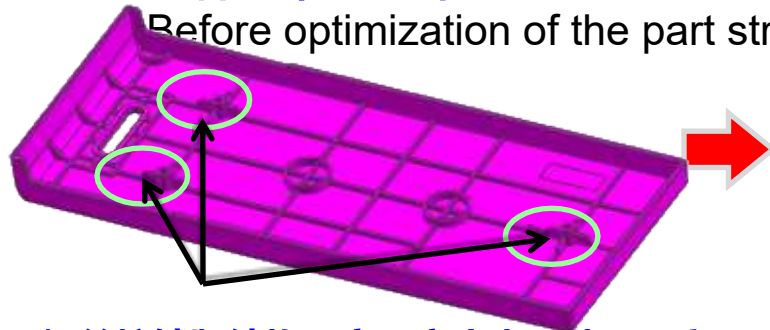


4. 3. 参加客户产品开发共同设计开发

Participate in clients product design

产品结构优化前

Before optimization of the part structure



螺丝柱锁紧结构，容易产生表面外观不良

Screw boss structure, cosmetic defects occur.

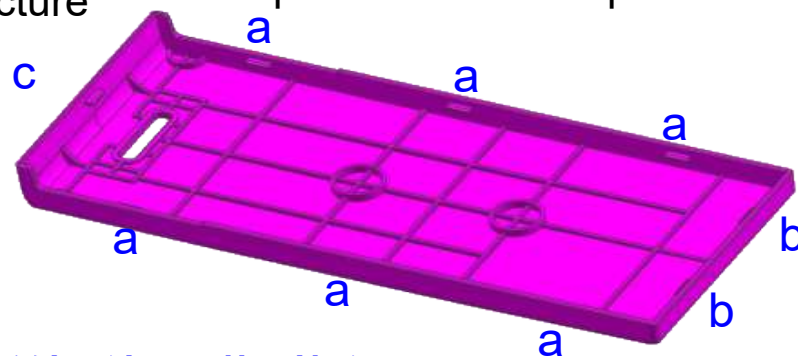


a处装配结构

A assembly structure

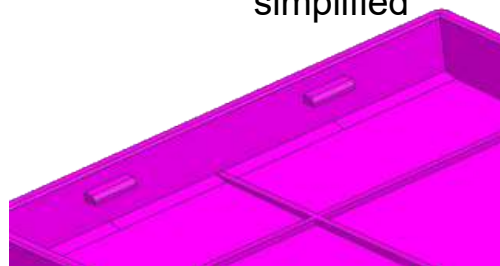
产品结构优化后

After optimization of the part structure



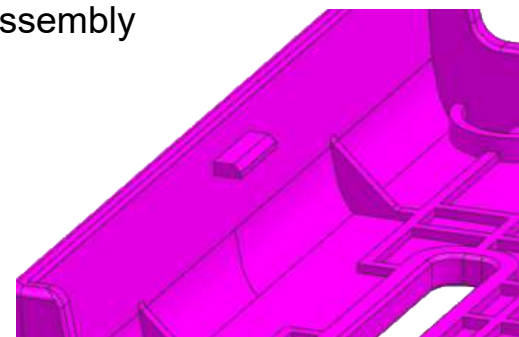
扣位锁紧结构，装配简单化

Buckle structure, assembly simplified



b处装配结构

B assembly structure



c处装配结构

C assembly structure

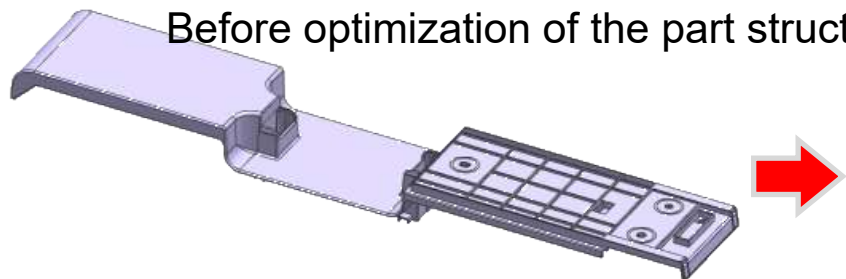
➤ 技术优势:

- **参与客户产品设计开发产品结构优化** help design to optimize parts structure
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- **简化了组装工序，提高组装产能** Simplify the assembly process, improve assembly capacity

4.3. 参加客户产品开发共同设计开发 Participate in clients product design

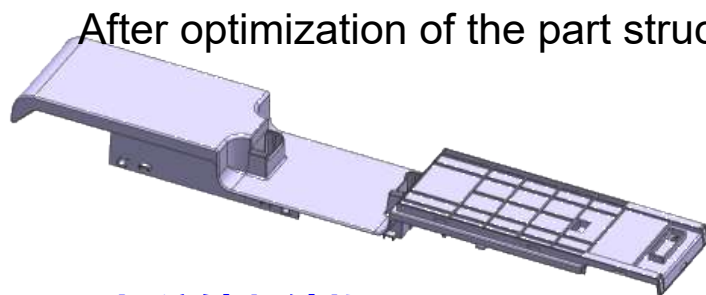
产品结构优化前

Before optimization of the part structure



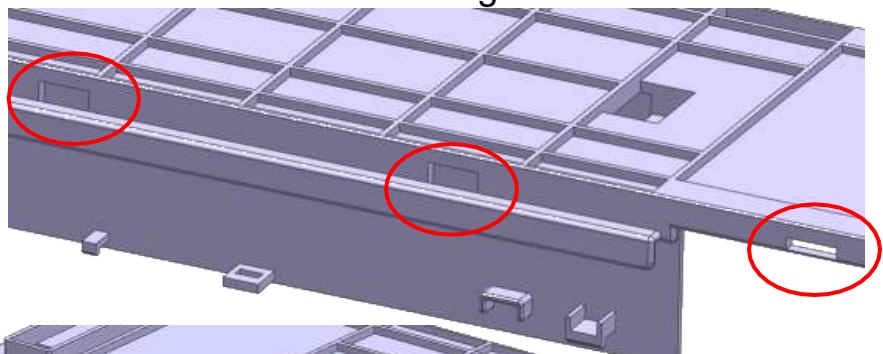
产品结构优化后

After optimization of the part structure



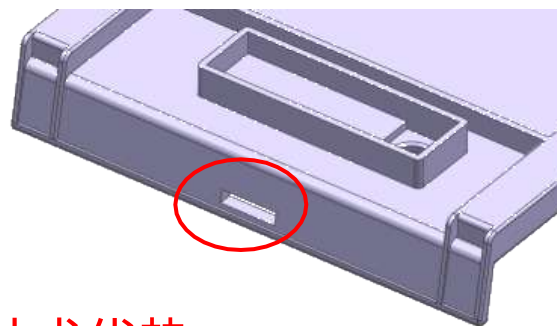
螺丝柱锁紧结构

Screw boss locking structure



扣位锁紧结构

Buckle locking structure



➤ 技术优势： Technical advantages

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Participate in clients product design

产品结构优化前

Before optimization of the part structure



螺丝组装

成本高、效率低、外观可看到螺丝

Screw assembly:

High cost, low efficiency, Screws are visible

设计为扣位组装

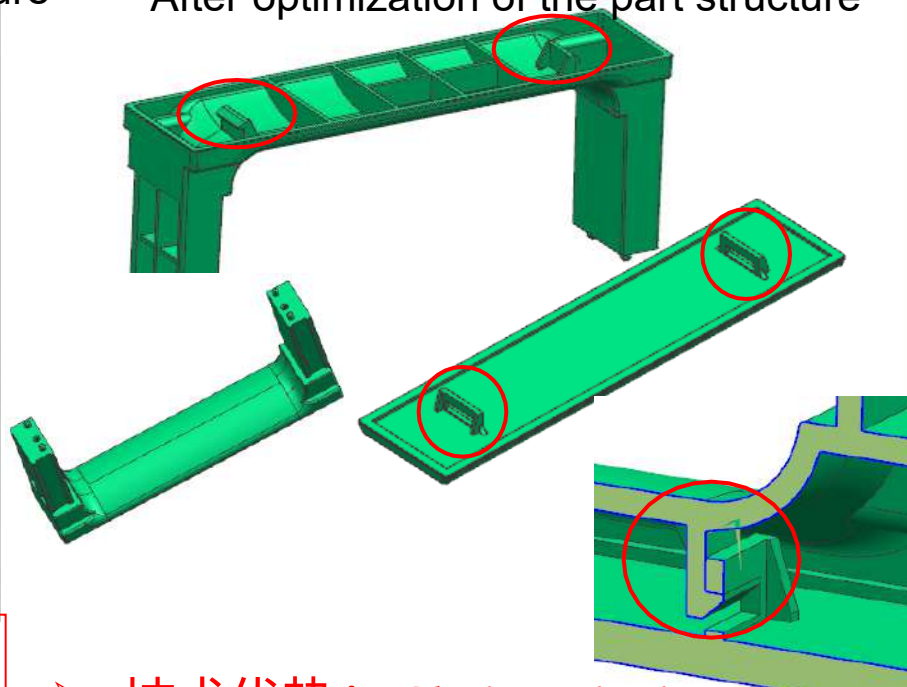
成型低、效率高、外观美观

buckle assembly:

Low molding, high efficiency, nice looking

产品结构优化后

After optimization of the part structure



➤ 技术优势： Technical advantages

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产品结构优化前

Before optimization of the part structure



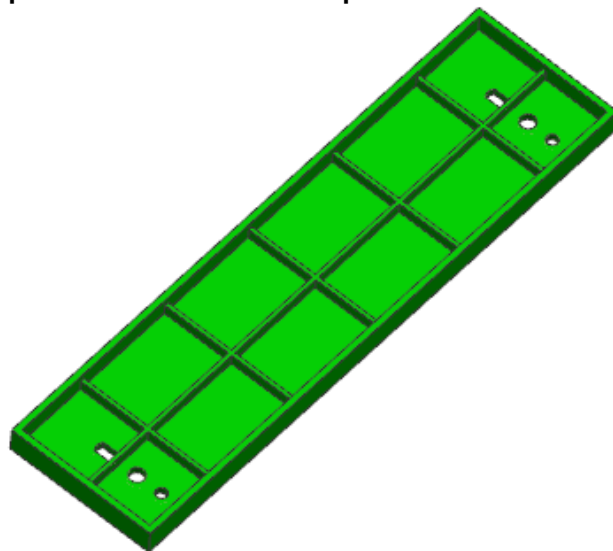
五金件（成本高）
Metal parts (high cost)

➤ 技术优势： Technical advantages

- 参与客户产品设计开发产品结构优化 help design to optimize parts structure
- 降低产品成本 Reduce product costs
- 缩短了产品开发的日程 Shorten the part designed time

产品结构优化后

After optimization of the part structure



塑胶件[POM]（成本低）
Plastic parts [POM] (low cost)

4. 3. 参加客户产品开发共同设计开发

Participate in clients product design

产品结构优化前

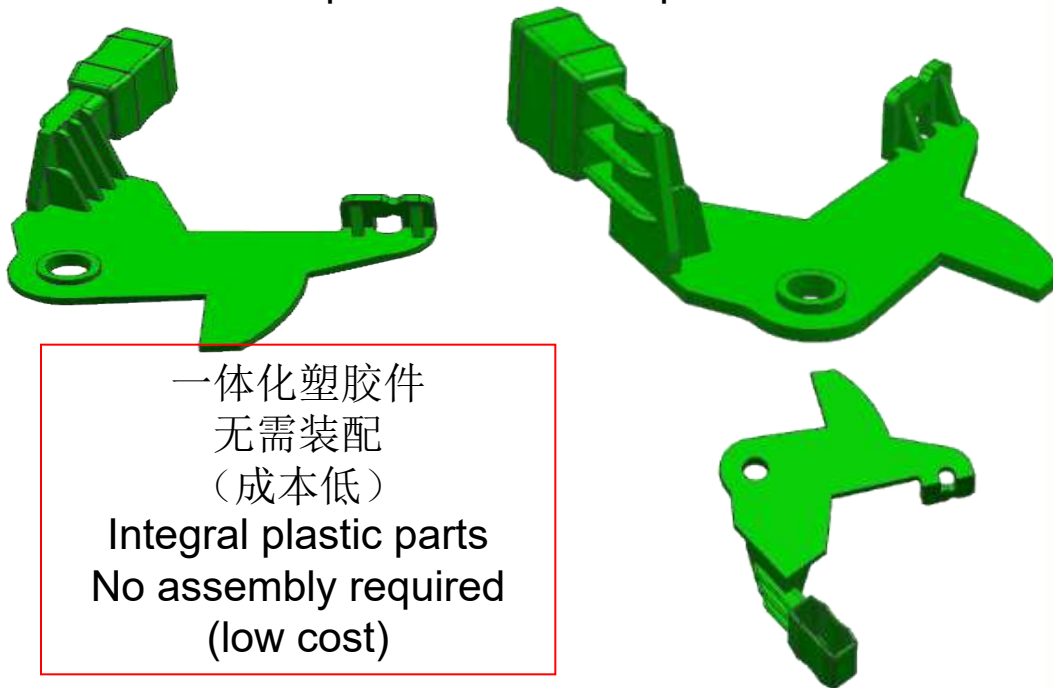
Before optimization of the part structure



五金件+塑胶件
需要装配
(成本高)
Metal parts+ plastic parts
assembly required
(high cost)

产品结构优化后

After optimization of the part structure



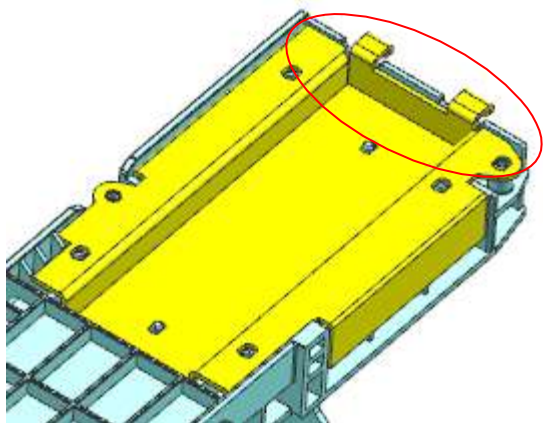
一体化塑胶件
无需装配
(成本低)
Integral plastic parts
No assembly required
(low cost)

- **技术优势:** Technical advantages
- **参与客户产品设计开发产品结构优化**
- help design to optimize parts structure
- **减少了产品组装 工序降低产品成本**
- Reduced product assembly process to reduce product costs
- **提升了产品的产能** Enhance the product capacity

4. 3. 参加客户产品开发共同设计开发 Participate in clients product design

产品结构优化前

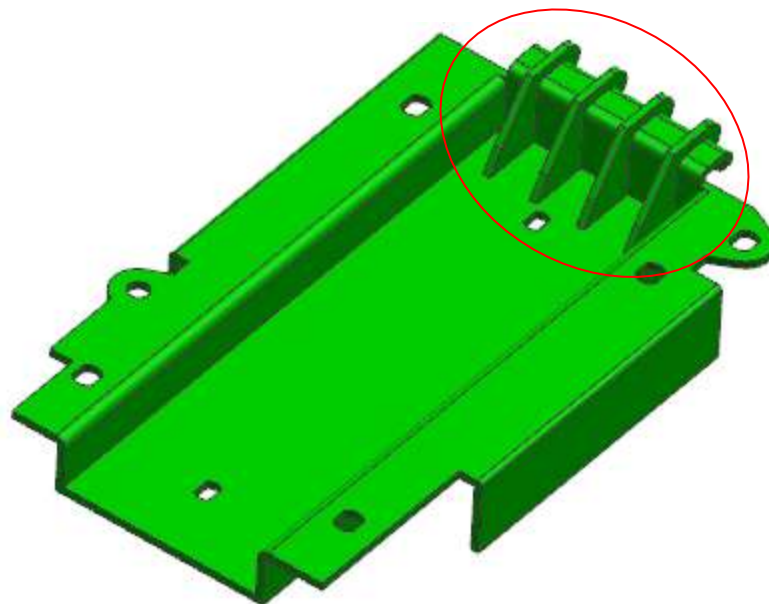
Before optimization of the part structure



五金件 metal parts

产品结构优化后

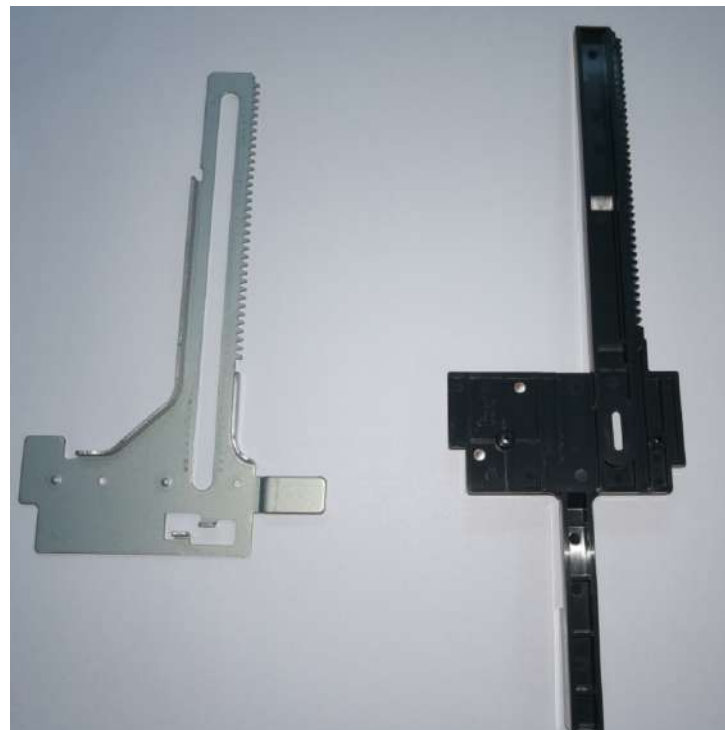
After optimization of the part structure



塑胶件 plastic parts

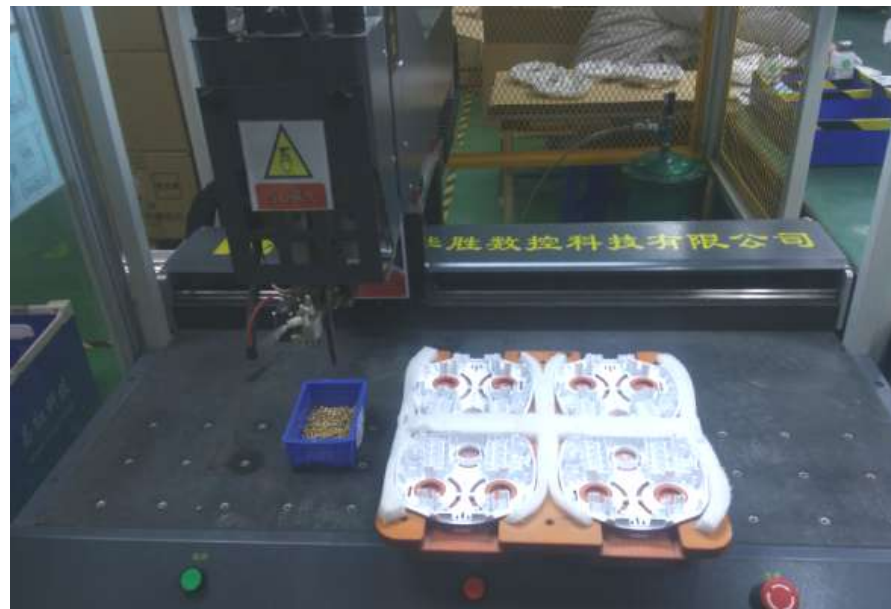
- **技术优势:** Technical advantages
- **参与客户产品设计开发产品结构优化** help design to optimize parts structure
- **降低产品成本** Reduce parts cost

4.3. 参加客户产品开发共同设计开发 Participate in clients product design



- **技术优势:** Technical advantages
 - **参与客户产品设计开发五金产品变更为塑胶产品** help design plastic products to replace metal parts
 - **降低成本** reduce product cost
 - **缩短了产品开发的日程** shorten product designed time

4. 热熔螺母全自动化生产 Heat staking for nut assembly



- **技术优势:** Technical advantages
 - 减少降低二次加工人工成本 Reduce the labor cost of secondary process
 - 改善了品质稳定性 Improved the stability of quality
 - 大幅度提升了生产产能 improved the production capacity

4. 5. 产学研合作及自主研究情况

Industry-university-research cooperation achievement

- 与华中科技大学联合建立“精密注塑成型与注塑模具制造产业化基地”；与广东工业大学联合建立“昌红-广东工业大学模具制造研究开发中心”和“广东省精密注塑模具（昌红）工程技术研究中心”；与深圳大学联合开展科技攻关项目；

CHT and Huazhong University of Science and Technology jointly established the “precision injection molding manufacturing industry base”;

CHT and Guangdong University of Technology jointly established “Changhong - Guangdong University of Mold Manufacturing Research and Development Center” and “Guangdong Province precision injection mold engineering Technology Research Center”;

CHT and Shenzhen University jointly carry out scientific and technological projects;

- 为“广东省教育部科技部产学研结合示范基地”，为“广东工业大学大学生实习基地”和“广东技术示范学院大学生实习基地”；

CHT is also authorized as “the demonstration base of academic industry by Ministry of Education of Guangdong Province” ; “Guangdong University of Technology internship base” and “Guangdong Technical Demonstration College internship base”;

➤ 与广东工业大学联合开展的“难加工脆性碳素零部件的高速精密加工关键技术及应用”

项目荣获2015年度**广东省科学技术奖一等奖**，省奖励办推荐该项目申报2017年度国家科技进步奖。

CHT and Guangdong University of Technology jointly carried out "difficult to process crisp carbon components of high-speed precision machining key technology and application" Project which won the 2015 Guangdong Provincial Science and Technology Award first prize, and the provincial reward office recommended the project to declare 2017 National Science and Technology Progress Award.



第一章 数字化 / 自动化应用介绍

Introduction of digitized / automated application

第二章 新技术导入介绍

Introduction of new technology imported

第三章 共同研发优化产品结构

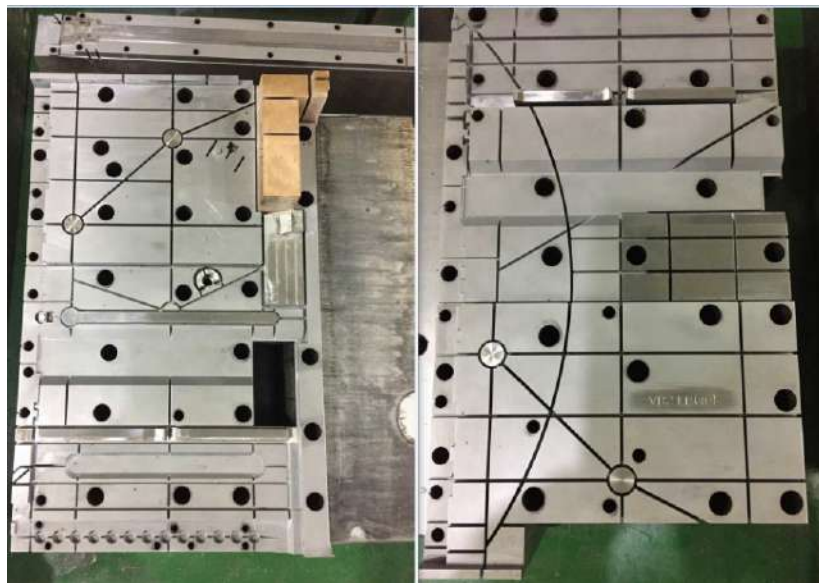
Cooperative design to optimize the product structure

第四章 快速模具应用（CNC为主的模具加工）

Rapid tooling Technology (CNC-based tooling processing)

4. 2. 快速模具应用（CNC为主的模具加工）

Rapid tooling application (CNC-based tooling processing)



- 技术优势: Technical advantage
- 减少注塑二次加工
- Reduce the secondary injection processing
- 提升品质;
- Improve the quality;
- 降低人工成本;
- Reduce labor cost;



Thanks !