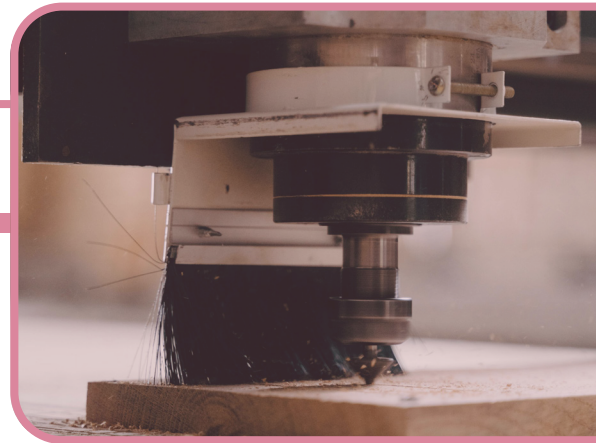


CONCEPT Molding is a manufacturing process that involves shaping a material into a specific form or design by using a mold. In additive manufacturing, molding is achieved by using 3D printing techniques to build up layers of material until the desired shape is achieved. This process is often used for creating small, intricate parts or prototypes. Subtractive manufacturing, on the other hand, involves removing material from a larger piece to create the desired shape, often using milling or lathing techniques. Molding is a versatile technique that can be used with a wide range of materials, including plastics, metals, and ceramics, making it a popular choice in many different industries. It is a cost-effective way to produce complex parts with high precision and can be used to create both small and large scale products.

BACKGROUND

The history of molding in additive/subtractive manufacturing dates back to the early 20th century when the injection molding process was invented. It involves the use of a mold to shape a plastic material into a desired form. This process has since been adapted to various materials and industries. In the 1980s, additive manufacturing technologies, such as stereolithography, were introduced, allowing for the creation of 3D objects through the layering of materials. In the 1990s, computer numerical control (CNC) machines became popular, allowing for precise shaping of materials through subtractive manufacturing. Today, both additive and subtractive manufacturing technologies continue to evolve, with advancements in materials, software, and automation leading to increased efficiency and precision.



Make sure it measures up

REAL WORLD CONNECTIONS

One example of molding in additive/subtractive manufacturing in Nebraska is the production of plastic parts using injection molding. Companies such as Nebraska Plastics, located in La Vista, Nebraska, specialize in the manufacturing of custom plastic parts through injection molding. They use a mold to shape melted plastic into the desired form, allowing for the mass production of identical parts. Additionally, there are several additive manufacturing companies in Nebraska, such as 3D Innovations, located in Omaha, which provide 3D printing services for various industries, including medical, aerospace, and automotive. These technologies allow for the creation of complex and intricate designs that may not be possible through traditional manufacturing methods.

APPLICATION

One example of subtractive manufacturing is the production of custom wood products such as cabinets, furniture, and millwork utilizing a CNC router. In Nebraska, there are many woodworking companies that use CNC routers to create precise cuts and shapes on wooden materials. The CNC router takes the design file created in CAD software and translates it into tool paths that the machine follows to cut and shape the material. This allows for highly accurate and repeatable production of custom wood products, which can be customized to the exact specifications of the client. The use of CNC routers in woodworking also enables the production of complex designs that would be difficult or impossible to create by hand.

EXAMPLES

MOLD: The mold is a critical component in the molding process. It is a hollow form that is used to shape the material being molded. The mold can be made from various materials, including metal, plastic, or ceramic, depending on the application and the material being molded.

MATERIAL: The material being molded is also an essential component in the process. In additive manufacturing, the material is typically in the form of a filament or resin that is fed into the 3D printer. In subtractive manufacturing, the material is a larger block or piece of material that is cut down to the desired shape.

3D PRINTER/CNC MACHINE: In additive manufacturing, a 3D printer is used to build up layers of material to create the desired shape. In subtractive manufacturing, a CNC machine is used to remove material from a larger piece to create the desired shape.

CAD SOFTWARE: Computer-aided design (CAD) software is used to create the design or model of the part or product being molded. The CAD software generates a digital model that is used to control the 3D printer or CNC machine.

POST-PROCESSING EQUIPMENT: After the molding process is complete, post-processing equipment may be required to clean, smooth, or finish the final product. This equipment can include sanding or polishing tools, as well as chemical treatments or coatings.



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