Metal Injection Moulding Technical Newsletter

World Finest MIM Technology from Japan "μ -MIM ®"

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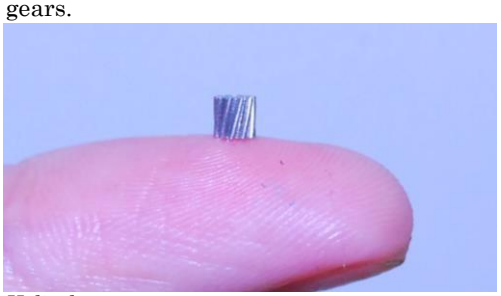
1. Applications of MIM-made gears

Application example (1): Helical gear with external teeth

Downsizing from the conventional method, shapes that are difficult to machine and achieving lower costs with MIM technology Mass production of very small metal gears is one of the major applications of MIM. This is because, since MIM uses moulds in production, and is excellent in mass production, then within the scope of what can be handled using moulds and moulding techniques (insert moulding, the use of sacrificial resin moulds, two-colour moulding or the like) it is able to handle shapes that cannot be handled by machine processing. In this article, we will introduce major applications of these MIM-made gears.



▲Helical gear

"Helical gear" refers to a gear with the teeth cut at angle to the face of the gear. In the case of a very small helical gear (e.g. module 0.2 or below), mass production by the conventional method is almost impossible.

For mass production machining of ordinary gears, a hobbing machine is used, but there is no hobbing machine that can machine helical forms of gears as small as those module 0.2 or below, for example, in the above photograph.

For this reason, if you would like to produce CNC machining in accordance with the shape of each teeth of the gear is required. In order to CNC machining a tooth this small, a correspondingly small tool is required. However, a very small tool will break easily, thus careful management of the cutting edge will be required and these facts will push the cost high.

Accordingly, even with mass production of a thousand or ten thousand units, costs cannot be held down at a realistic amount.

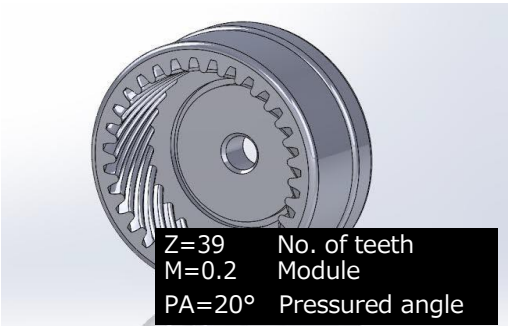
▲Miter gear and bevel gear

In MIM, one mould is produced, mass production becomes possible, and the cost of producing the gears, which was high due to their shape and size, can be reduced.

Application example (2): Miter gear and bevel gear

In the case of a typical flat shaped gear, axial force (rotational force) is expressed in a plane. On the other hand, in special gears such as miter gears or bevel gears are applied to change the direction of the axial force, thus, it is necessary to process the teeth obliquely to the radial direction. Previously these gears could only be processed by CNC machining or by a specially designed machine, and when they become smaller than fingertip size mass production became impossible, therefore switching to a resin gear or the like was unavoidable. However, if MIM is carried out, as with the helical gear, mass production of very small gears can be achieved, and this is widely utilized.

Application example (3): internal tooth helical gear



▲New development: internal tooth helical gear

In particular, an internal tooth gear without perforated, such as a bottom attached without any recess allowance, as shown in the diagram above, cannot be produced by other kind of processes.

2. Internship activity

We hosted interns from Doshisha University Graduate School and the Osaka Prefectural University College of Technology. They studied at Osaka research laboratory, factory and R&D facility in Thailand. Regarding the Doshisha students we introduces a new idea and had them grapple with analysis and proposing improvements to our website and pamphlets from a management studies point of view. We have received many interesting opinions from the perspective of youth.

For the technical college students, we arranged training at our Thailand factory, having them grapple with understanding the debinding process and sintering deformation in the initial-stage of sintering.

The overriding goal of this internship was for them to experience the enjoyment and fascination of technology research and manufacturing.

▲Our employees (right) and the students

COMPAMED 2016 in Düsseldorf, Germany between 14th and 17th November 2016

Taisei Column

Dr. Kenji Okubo: R&D department

Hello everyone. My name is Kenji Okubo of the research and development unit. My work focuses on technical development of MIM and providing technical solutions to our customers. I am in charge of making the prototype parts.

Actually, in our research and development unit we all have music as our hobby. If we all get together, we end up doing an orchestral performance. In high school, I played the drums, but having settled down a bit I now play the trumpet.

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