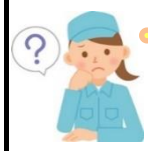
Think threads with YAMAWA

No.005

How to use Roll Taps

Roll taps

【Question】



I'm going to try roll taps for the first time.
Can you tell me the best way to use roll taps?
Further, I've heard it is not easy to control the bored hole diameter.

【Answer】

The proper application of roll taps is not difficult once you become familiar with the best way to select and use them.
Roll taps work better, if you follow a standard way to select and apply them. I think there is a short cut that may help you reach really good results while using roll taps.

Once you gain the experience, you will find your own unique way to use roll taps.
Here I would like to introduce you to the basic way to use roll taps.

【Basic way to choose Roll taps】

Selection of material to be tapped

● At first, confirm if the material is suitable for tapping with roll taps.
Tapping with roll taps is applicable to non-ferrous material like aluminum and soft steels, but not for cast irons and hard steels.

Initial selection of the roll tap

● Yamawa's N+RS is for roll tapping of non-ferrous material like aluminum and the Yamawa N+RZ is for roll tapping of soft steels.
If you need longer tool life for production runs, I would recommend the Yamawa HP+RZ.
● I would recommend a Plug Chamfer for through hole tapping and a Bottoming Chamfer for blind hole tapping.
● I suggest you choose a standard thread class first for the thread class of fit.

How to confirm the tap thread class adaptable to the thread class of fit for the internal thread.

On the first thread produced, prepare the bored hole diameter slightly bigger than recommended.

● For the first tap test, I sugget you choose a bored hole diameter a little larger than standard diameter recommended.
※If the initial bored hole diameter is too small, it can cause the problem of excessive material deformation and tap breakage.

Tapping with the roll tap initially selected.

● Try tapping first with the roll tap initially selected.
① If the Go plug gauge measurers tight, there is a possibility that shrinkage in the internal thread was caused by elastic features of the material. Try tapping again with a roll tap of one thread class limit larger .
② If the NoGo plug gauge measures too loose, try tapping again with the roll tap of one thread class limit smaller.When you still have the above problems, reconsider the kind of the tap selected.

① When the Go plug gauge measures tight, try tapping again with a tap with a larger thread class.

② When the NoGo plug gauge measures too large of a thread size, try tapping again with a smaller thread class.

③ If the Go and NoGo gauges are OK, it means the selected thread class for the tap is appropriate.

③ If both the internal threads Go and NoGo are OK after tapping, it means the thread limit of the tap is appropriate.

The above explanation looks difficult to understand. But I feel I can use roll tap by proceeding with your step by step suggestions in order. Do you think I can?

Yes I do. Let's move on to the selection of a bored hole diameter on the next page.

For setting the bored hole diameter, the basic procedure is minute adjusting while checking with the pin gauge for minor diameter.

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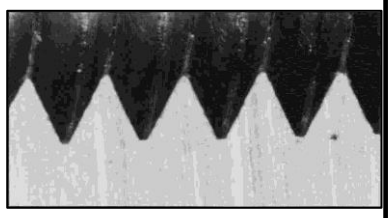
In test tapping shown on the previous page, for safety reasons, the bored hole diameter is set a little bit larger. Through decreasing the diameter incrementally, then you can find the most appropriate bored hole diameter.

（Basic procedure to find the bored hole diameter）

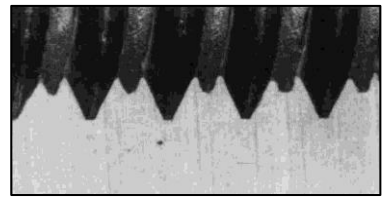
Measure the minor diameter of the internal threads that were accepted through both the GO and NOT-GO inspection guages ③ shown in previous page.

④
If the GO pin gauge for the minor diameter is NG, try tapping again by making the bored hole diameter larger.



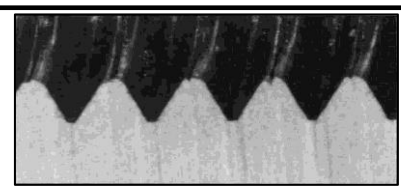
If bored hole diameter is smaller, material deformation becomes excessive.

⑤
If the NOT-GO pin gage for minor diameter is NG, try tapping again by making the bored hole diameter smaller.



If the bored hole diameter is larger, material deformation becomes too small.

⑥
If both the GO and NOT-GO pin gage inspection is OK, it means the bored hole diameter is appropriate. We have



**If the bored hole diameter needs to be larger or smaller.
Then how much should we adjust ?**

**Let's assume the target of the minor diameter as A. And let's assume the minor diameter after tapping is B. Guideline of adjusting value C :
You can roughly get the value from formula (A-B)/2=C**

＜Adjusting example of bored hole diameter＞

M6x1 Target minor diameter is set to be 5.0mm (rate of thread engagement 93%)

**We assume when we set the bored hole diameter at 5.4mm, completed the minor diameter has become 4.8mm (rate of engagement 111%).
This looks like ④ shown in above picture.
In this case the formula is (5.0-4.8)/2=0.1. If you make the bored hole diameter 0.1mm larger than 5.4mm, then, completed minor diameter will become close to 5.0mm.**

**On the other hand, we assume when the minor diameter is set as 5.6mm, completed the minor diameter has become 5.2mm (rate of engagement 74%).
In this case formula is (5.0-5.2)/2=−0.1. If you make the bored hole diameter to 5.5mm, 0.1mm smaller than 5.6mm, then, completed minor diameter will become close to 5.0mm.
In the above picture ⑥、when the bored hole diameter is 5.5mm, the minor diameter is completed the most appropriate diameter, 5.0mm.
The actual situation may not be the same with this calculation, but the above calculation will give us a guideline for adjusting the bored hole diameter.**

As a tool for checking minor diameter, use the CPC-S (Minor diameter checkpin for cutting tap) and you will find it useful.

**Check Pins for Bored Hole：
CPC-S**

By using the CPC-S (minor diameter checkpin for a cutting tap), we can check the minor diameter in the range of engagement rate 100%-70% with 5% increments. By using CPC-S, we can check the minor diameter of internal threads completed by roll taps as well by 5% increments.