● SHAPER CUTTER /

How to examine the helical guide common use

The helical movement of the cutter is generated by a helical guide.
The lead of the guide must be equal to the axial pitch of the helix of the cutter.
If it's available a helical guide with a lead L you can choose, sometimes,
the characteristic of the cutter in accordance with the lead L.
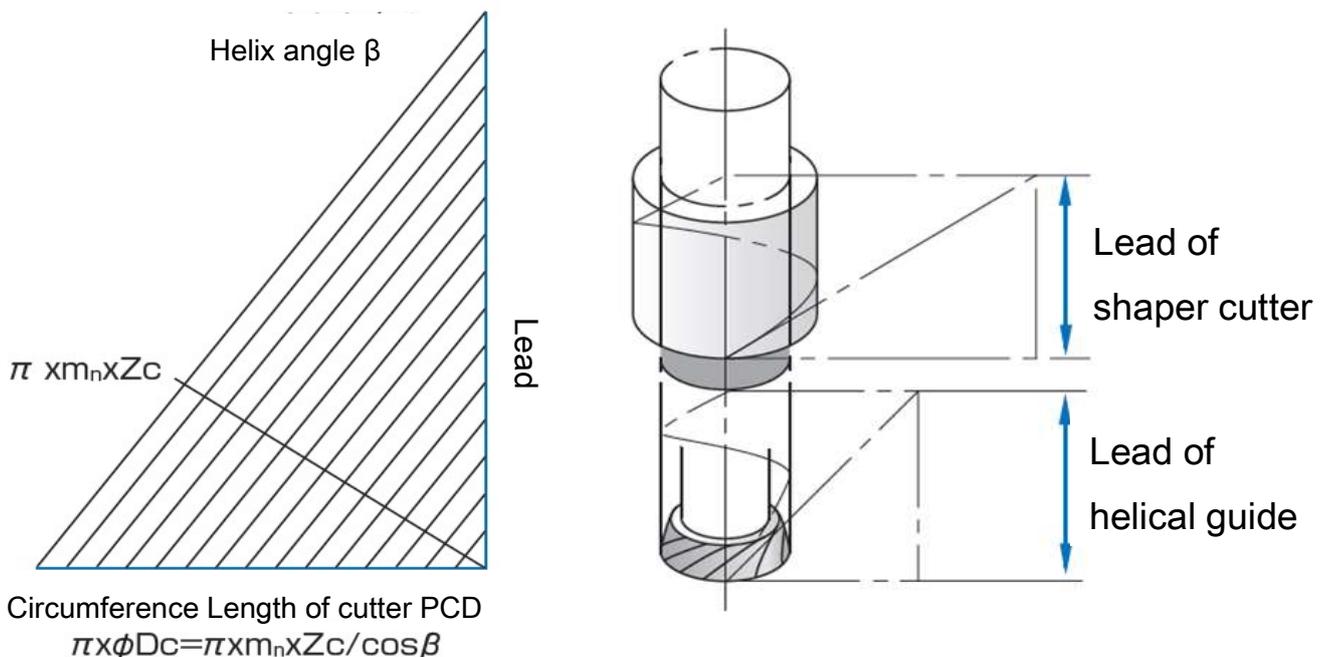This means that with a single guide you can use different shaper cutters.
It can be calculated with the formula as follows,

No.1 $L = \pi \times m_n \times Z_c / \sin \beta$ m_n : Normal Module Z_c : Numbers of cutter tooth

β : Cutter helix angle (°)

< Condition >
1. L should be as same as the helical guide lead you like to use.
2. Helix hand of the cutter should be opposite hand of the gears for external gears,
   on the other hand, for internal gears, should be the same hand as the gears.

Helix angle β

$\pi \times m_n \times Z_c$

Lead

Circumference Length of cutter PCD
$\pi \times \phi D_c = \pi \times m_n \times Z_c / \cos \beta$

Lead of shaper cutter

Lead of helical guide

1. Calculate Ideal Lead length for 2 shaper cutters

Cutter A

Module 2.0

Helix angle 30°RH

Cutter NT   71

Cutter B

Module 2.5

Helix angle 25°RH

Cutter NT   48

L = 892.2123mm

L = 892.0370mm

2. Calculate Lead angle error in case of the shared guide

a) Calculate the helical angle of Cutter B in case of
    sharing the guide lead of Cutter A

Cutter B/ Module 2.5, NT 48
Shared Guide lead 892.2123mm

β'=Asin(Mn*Zn*PI/Shared guide lead)

β'= 24.99475 degrees

b) Calculate the lead angle error   fHβ △

fHβ Δ = B×(tan β' - tan β)
B (gear width at inspection process)=24mm

fHβ = -0.00267 ≒ 3μm

If the tolerance of fHβ is acceptable with 3μm error,

2 cutters can be cut with one guide lead 892.2123mm

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