

## 6.4 Tooth bearings

Regardless of how accurate the gear itself may be, poor tooth bearing not only causes oscillation and noise but also have bad effect on gear's life span.

Refer to Fig. 2. Extracted **Tooth bearing on gear from JIS B 1741-1977 (old)**

JIS B1741 (old) 「Tooth bearing on Gear」 stipulates percentage of tooth bearing mark as follows.

As for Tooth trace direction, it is percentage (%) of mean value  $b_c$  of Length of tooth bearing for Effective length of trace -  $b'$ . As for Tooth depth direction, it is percentage (%) of mean value  $l_c$  of tooth bearing width for Working depth -  $h'$ .

Note\* For edge of gear tooth with chamfering, Effective length of trace is after deducting chamfered area. For different Effective lengths of Tooth trace between Pinion and Gear, take the shorter side.

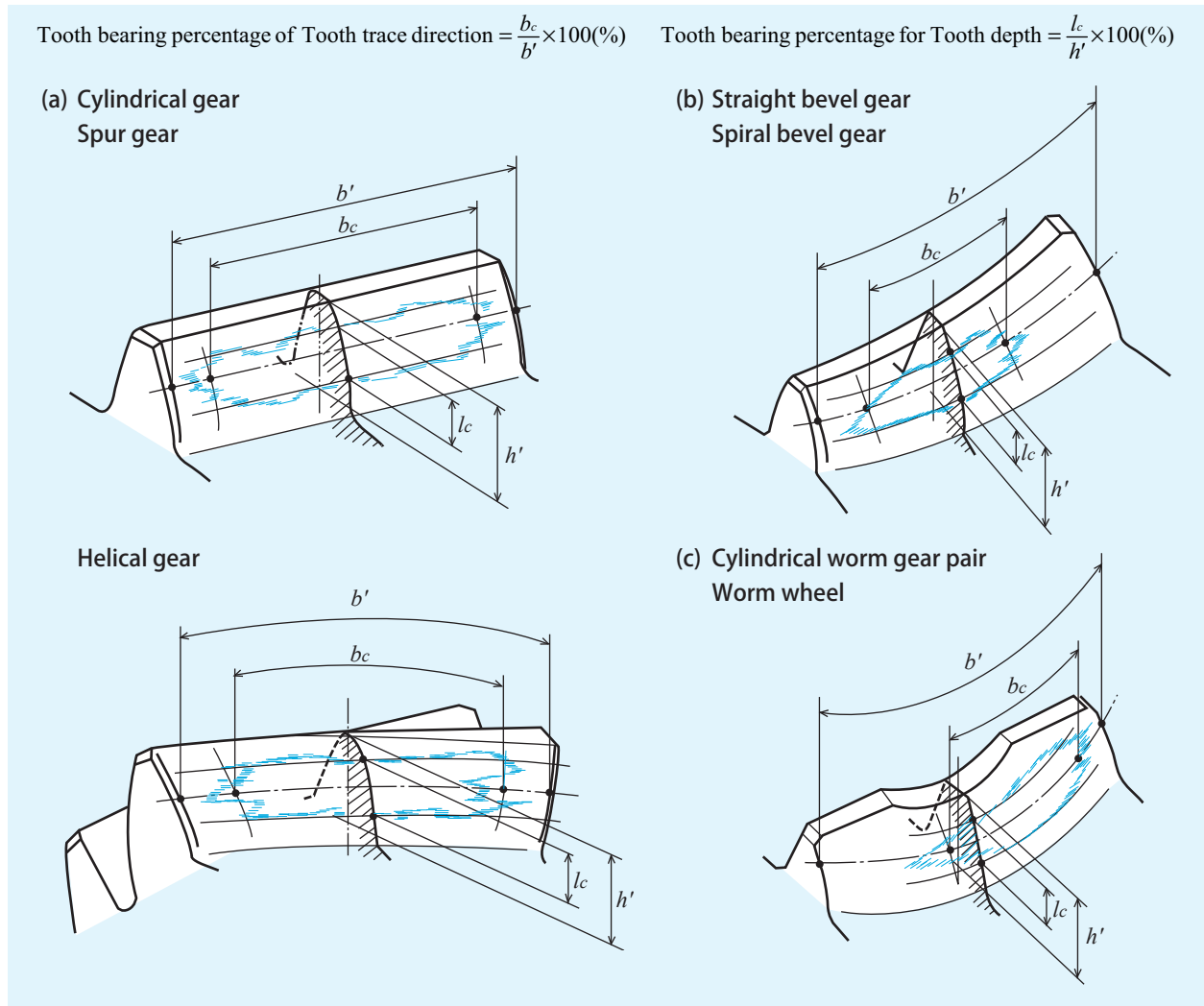


Fig. 2 Tooth bearing

Refer to Fig. 3 for Bevel gear with Crowning and empty load. It is desirable that centre of tooth bearing in Tooth trace direction is about 60% of Length of tooth trace from heel.

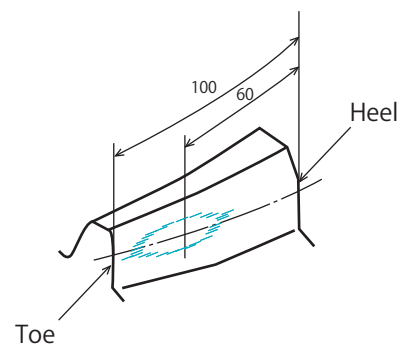
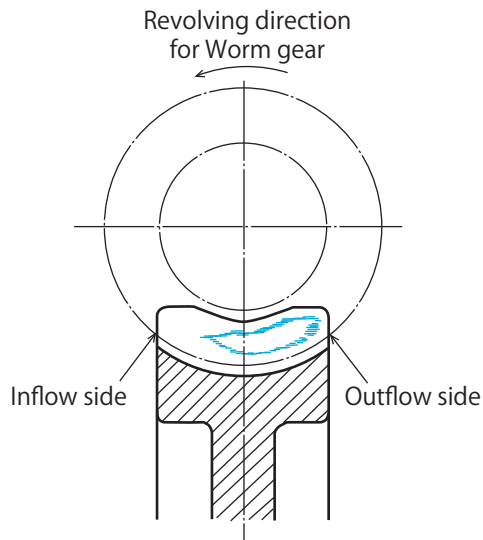


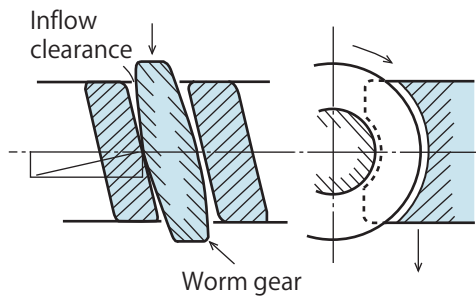
Fig. 3 Tooth bearing for Bevel gear with Crowning.

Percentage of tooth bearing for Worm gear pair is for Worm wheel engaged with Worm gear.  
In general, Tooth bearing to inflow side of flank of Worm wheel is not desirable. It is desirable for Tooth bearing centre in Tooth trace direction to be biased towards outflow side to make clearance at inflow side. (Refer to Fig. 4)

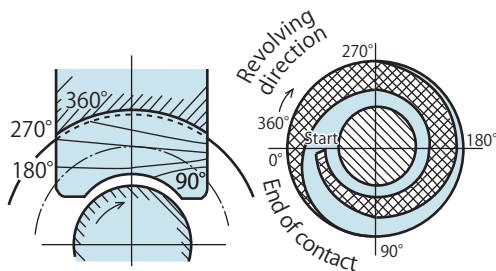
**Fig. 4 Tooth bearing for Worm wheel**



**Fig. 5 Inflow clearance for Worm gear pair**  
{A few problems of lubricating oil for Worm gear pair and research work for machine. Volume 8, No. 4 (1956) written by Dr. Waguri and Dr. Ueno from Yokendo Co. Ltd.}



**Fig. 6 Line of contact for Worm gear pair (2 number of threads) and Tooth bearing for standard Worm gear.** Quoted literature is the same as Fig. 5.

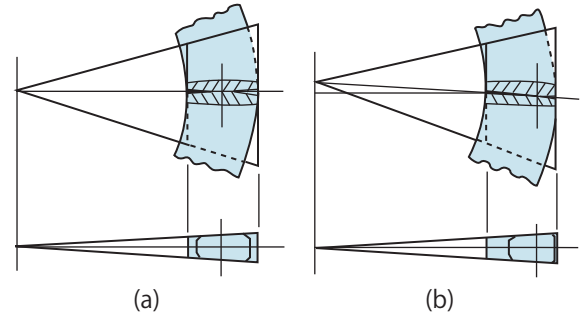


**Fig. 7 Engagement for Bevel gear with Crowning**  
{Gleason Company, INSTALLATION OF BEVEL GEARS (1965)}

#### Coniflex® Bevel Gear

(Straight bevel gear with Crowning)

® mark is Gleason Works trademark



#### Spiral bevel gear

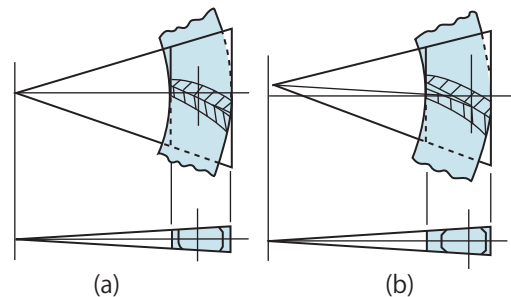
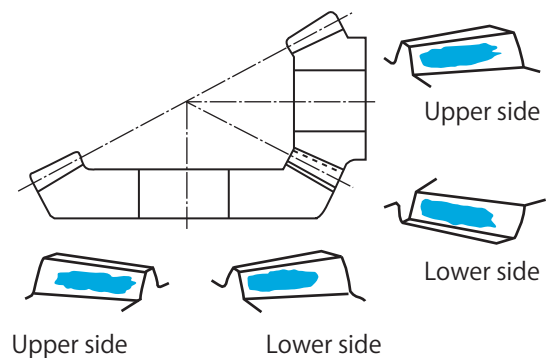


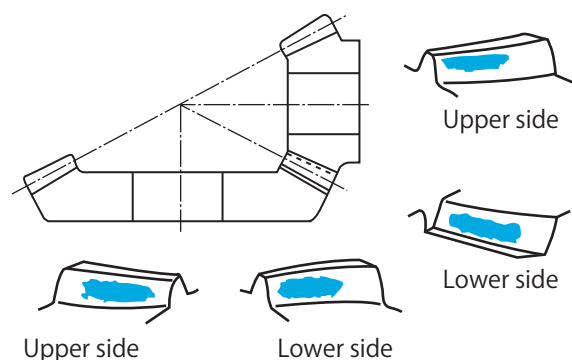
Fig. (a) shows proper assembly method, (b) is assembled off centre from location of Top cone. Please observe the difference in position for Tooth bearing.

**Fig.8 Ideal tooth bearing for Bevel gear**



#### Spiral bevel gear

(Pinion: Shape of teeth is left hand)



**Table 4. Percentage of tooth bearing for Cylindrical gear (Spur and Helical gears)**

Class	Percentage of tooth bearing	
	Tooth trace direction	Tooth depth direction
A	Above 70% of Effective length of Tooth trace	Above 40% of Effective length of Tooth profile
B	Above 50% of Effective length of Tooth trace	Above 30% of Effective length of Tooth profile
C	Above 35% of Effective length of Tooth trace	Above 20% of Effective length of Tooth profile

**Table 6. Percentage of tooth bearing for Bevel gear**

Class	Percentage of tooth bearing	
	Tooth trace direction	Tooth depth direction
A	Above 50% of effective length of Tooth trace	Above 40% of Effective length of Tooth profile
B	Above 35% of Effective length of Tooth trace	Above 30% of Effective length of Tooth profile
C	Above 25% of Effective length of Tooth trace	Above 20% of Effective length of Tooth profile

**Table 5. Percentage of tooth bearing for Worm gear pair (Worm wheel)**

Class	Percentage of tooth bearing	
	Tooth trace direction	Tooth depth direction
A	Above 50% of Effective length of Tooth trace	Above 40% of Effective length of Tooth profile
B	Above 35% of Effective length of Tooth trace	Above 30% of Effective length of Tooth profile
C	Above 20% of Effective length of Tooth trace	Above 20% of Effective length of Tooth profile

**Table 7. Table for Tooth bearing classification and System of accuracy**

Class	System of accuracy for Cylindrical gear	System of accuracy class for Bevel gear
	JIS B 1702-1960 (old)	JIS B 1704-1973
A	1, 2	1, 2
B	3, 4	3, 4
C	5, 6	5, 6