VIEWPOINT

"VIEWPOINT" provides an opportunity for readers to discuss problems and questions facing our industry.

Please address your questions and answers to: VIEWPOINT, GEAR TECHNOLOGY, P.O. Box 1426, Elk Grove Village, IL 60007.

Dear Editor:

Since we are a high volume shop, we were particularly interested in Mr. Kotlyar's article describing the effects of hob length on production efficiency which appeared in the Sept/Oct issue of GEAR TECHNOLOGY. Unfortunately, some readers may be unnecessarily deterred from applying the analysis to their own situations by the formidability of the mathematical calculations. I am making the following small suggestion concerning the evaluation of the constant terms.

The article's author adroitly recognizes that the ratio $a/b = \sin(q)$ when he uses equation (2.3) of the line in reducing the three equations into one polynominal in order to determine the length of the roughing zone. That same relationship can be employed in equation (2.2) of the workpiece eclipse; that is:

$$X^2 = (a/b)^2 (b^2 - Y^2) \approx (b^2 - Y^2)\sin^2 q$$

When the substitution for X^2 is made by using the above equality, the original constants of the fourth degree polynominal are reduced to simple single term expressions in four of the five terms:

$$KA = \cos^2 q$$

$$KB = -2Y_0 \cos^2 q$$

$$KC = Y_o^2 \cos^2 q + (HD/2)^2 \sin^2 q - b^2$$

$$KD = +2b^2 Y_o$$

$$KE = -b^2 Y_o^2$$

R. Mory
Process Engineer
Gear Development Department
Ford Motor Trans. & Chassis Div.
Livonia, Michigan

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NOTES FROM THE EDITOR'S DESK

The last two months have been both a time of difficulty and of growth for GEAR TECHNOLOGY. Unexpectedly, I found myself in the hospital, having surgery, and consequently out of commission for several weeks. At the same time, two individuals on our staff lost family members, and most of this period saw us getting ready for this preshow IMTS issue while being seriously short-staffed.

Problems, however, can often be turned into opportunities. We saw how well everyone pulled together to get the job done, each person extending themselves for others. G.T. has since added two new staff members, and we are now looking forward to continued growth in our work and in our industry.

September 3-11, 1986, the International Machine Tool Show will be held at McCormick Place Exposition Center. This show will be even larger than in years past, expanding to occupy over 2 million square feet. We will see a much needed improvement, a change of organization of exhibitors that will place manufacturers of similar lines in one area. Most Gear Equipment Manufacturers will be located in the new McCormick Place North. This should make your visit to the show easier and more productive.

As an added convenience to our readers, we have included a special index of our advertisers with *booth numbers and building locations. This index* will help you find the equipment you have been reading about. A preliminary index will appear in this issue, and next issue. Make your travel arrangements to Chicago early — this could be the biggest show yet.

Michael Goldstein
Editor/Publisher

VIEWPOINT

(continued from page 5)

Dear Editor:

As pointed out by a reader, the value of the helix angle in Table I of my article on helical gears in the March/April issue of GEAR TECHNOLOGY should have been 16.59467687. (helix angle = arc sin (π/11). This, incidentally was a misprint in the original publication in Machine Design.

Also, please note that I am enclosing Table 2 which was omitted.

Sincerely,
Eliot K. Buckingham, President
Buckingham Assoc., Inc.
Springfield, VT

Table 2 — Helix Angles for Exact Loads

Integer A	Helix Angle ψ1	Integer A	Helix Angle ψ1
4	51.75751851	15	12.08950814
5	38.92617544	16	11.32357080
6	31.57396132	17	10.64944699
7	26.66665193	18	10.05147839
8	23.12254873	19	9.51739193
9	20.43018899	20	9.03742809
10	18.31006687	21	8.60372642
11	16.59467687	22	8.20988341
12	15.17685827	23	7.85062891
13	13.98459310	24	7.52158526
14	12.96756767	25	7.21908557

Absorbing End Thrust Don't Make the Cure Worse than the Illness

All helical gears develop an end thrust that must be absorbed by a thrust bearing, angular contact roller bearing, or tapered roller bearing. If a thrust bearing is used and the gear shafts turn in plain journal bearings, then a free-body force analysis should be made in the gears to ensure that the gear blanks do not twist and that the shafts remain parallel. This analysis must include all external forces on the gear shafts and solidly connected elements.

To overcome the effects of end thrust, the double-helical (or herringbone) gear was developed. Here, the thrust from one helix supposedly balances the thrust from the other helix. However, even a single pair of helical gears is difficult to match, so double helicals (as in a herringbone drive) are virtually impossible to match. Usually, one gear (the pinion) is allowed to float and find its own center. But since this gear is moving axially, the loads on the helixes cannot be equal.

In a high speed set, the mass of the floating gear often prevents it from positioning, and one helix absorbs the full load. This bad situation is further compounded by the frequent use of high helix angles to increase the number of teeth in contact. But this alteration does not necessarily increase load carrying capacity.