July 2014

STELCO Bevel Gears for Finishing Mills; Trip to Indiana Gear with Darle Dudley

Maurice Knott

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MORGAN CONSTRUCTION CO.
ROLLING MILL DEPT. MEMORANDUM

TO: As Noted
FROM: Maurice Knott
SUBJECT: STELCO Bevel Gears for Finishing Mills
Trip to Indiana Gear with Darle Dudley

DISCUSSION:

1. Surface Finish

The bevel gears that were to be shipped last Friday, 30 July, are listed below. On returning from my last visit to Indiana Gear, I reported that the tooth surfaces of the gear member 164580A had a poor finish, an estimated 125 microinches. This member had been lapped when we arrived. The rough, torn look was eliminated by the lapping. Only a few of the deeper tear lines remained. Darle Dudley thought it was fine.

After looking at the finish on all of the gears listed below except 164972, and at some of the other gears that will be shipped later, it was decided that any with a surface finish which was not as good as 164975B would be lapped.

Indiana Gear felt that the roughness would have worn off gracefully in service.

<table>
<thead>
<tr>
<th>Finish</th>
<th>Tooth Bearing</th>
</tr>
</thead>
<tbody>
<tr>
<td>164575A-B</td>
<td>Lapped for Tooth Brg.</td>
</tr>
<tr>
<td>164577A-B</td>
<td>Lapped for Finish</td>
</tr>
<tr>
<td>164579A-B</td>
<td>Lapped for Finish</td>
</tr>
<tr>
<td>164580A-B</td>
<td>Lapped for Finish</td>
</tr>
<tr>
<td>164972A-B</td>
<td>Lapped for Tooth Brg.</td>
</tr>
<tr>
<td>164975A-B</td>
<td>Lapped for Tooth Brg.</td>
</tr>
</tbody>
</table>

2. Tooth Bearing

On two sets, 164575 and 164975, the tooth bearing at the different test positions was as illustrated by Figure 1. The shift of the bearing to the heel with offset is Gleason's estimate of what will happen under load. In the case of these two sets

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it was decided that the bearing should not go off the heel as shown. Al Kornmann said that the bearing at the heel could be eased off, and the rest of the bearing lengthened towards the toe, by lapping at the basis mounting distance with .020" offset. Darle Dudley called Mike Fallon at Gleason for his opinion. He recommended not having the bearing go off the heel and said that they would use the same manner of corrective lapping.

Mike Fallon was also asked his intention on introducing offset. Was a satisfactory tooth contact to be obtained with the offset introduced at the maximum, or cold mounting distance? Indiana Gear normally introduces the offset at the basic mounting distance, the expected running position. His answer was that the contact should stay satisfactory with the offset introduced at either position. Our drawing should be made specific about this.

Actually, when you look at Figure 1, it appears that the offset tooth contact is about the same for both positions.

3. Tooth Spacing

Indiana is going to record their tooth spacing check (Gleason Tester) for one set of each of the gear ratios and hands. This will be sixteen records of tooth spacing.

The records looked at on Monday showed the spacing to be very good. One decision made at the time was to accept .0004" as the maximum tooth to tooth pitch variation, rather than .0003". The .0004" was what Darle Dudley originally asked for and what Gleason recommended. There were several .0004" values on the several records reviewed. On one gear, which Mr. Dudley had rechecked, the two highest variations shifted their positions on the second check. Since the bulk of the variations are well under .0004", it was reasoned that these occasional highs that change location are reflecting finish rather than actual spacing.

4. Tensile Test Specimens

Davy & United's order calls for tensile specimens for each heat treatment batch. This request was overlooked on the STELCO order. They will

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be furnished in the future.

5. Core Hardness on Future Orders

On future orders Indiana Gear hopes to obtain the required case hardness with a lower core hardness. This change is being made to obtain a more machineable material. Darle Dudley was asked for a minimum figure for core hardness and he recommended 29 R. C. At present the core hardness is R. C. 32-36.

Maurice Knott

MK/cac
TOOTH BEARINGS ON 164975 B (164575 B SIMILAR)

Basic M.D. (0", 0")

Max. M.D. (+0.010", +0.003")

Basic M.D. + .016" Offset

Basic M.D. + .008" Offset

Max. M.D. + .016 Offset