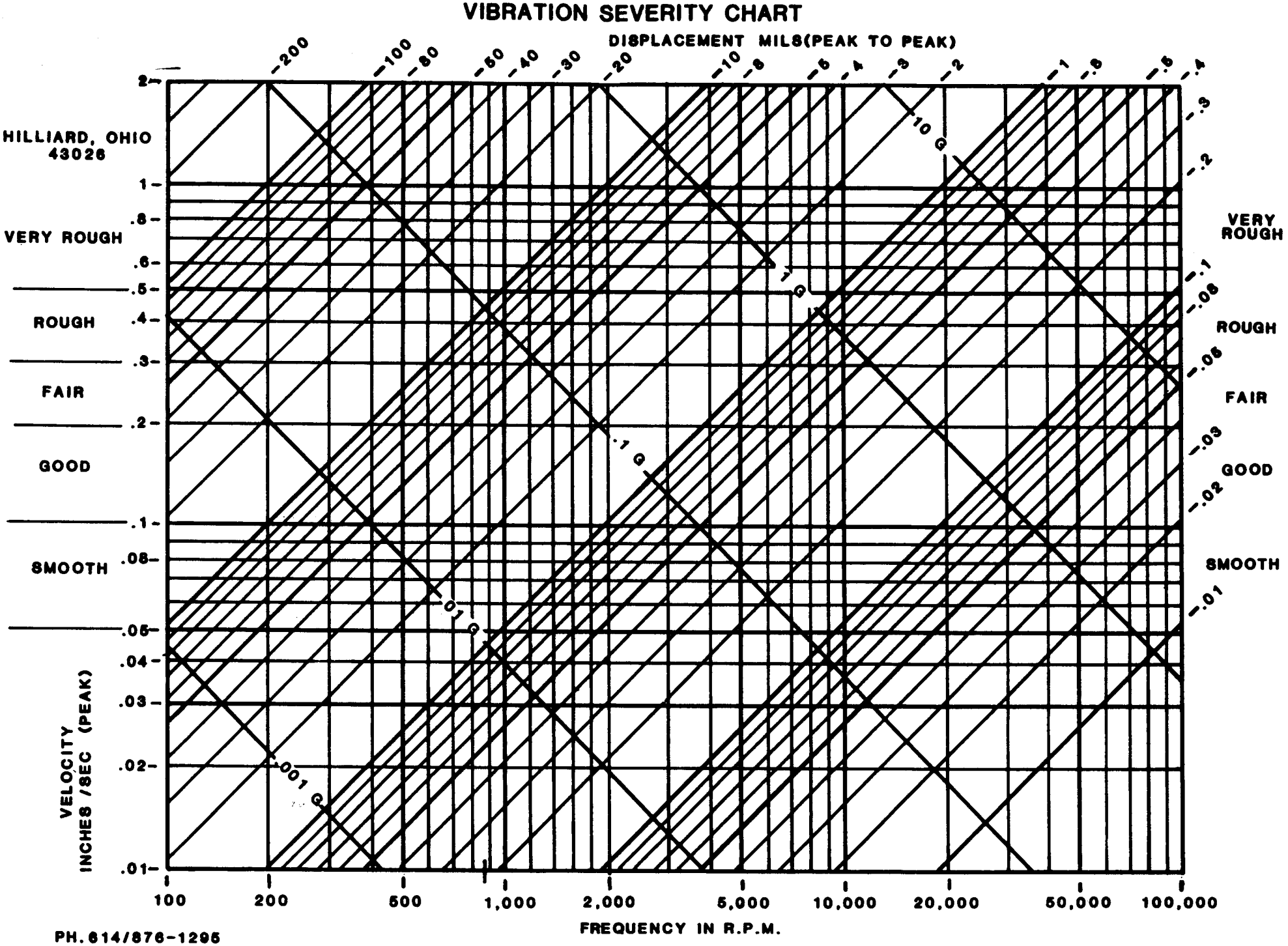
VIBRATION SEVERITY CHART
DISPLACEMENT MILS(PEAK TO PEAK)
200
100
80
50
40
30
20
10
8
6
5
4
3
2
1
.8
.6
.5
.4
HILLIARD, OHIO
43026
VERY ROUGH
ROUGH
FAIR
GOOD
SMOOTH
2
1
.8
.6
.5
.4
.3
.2
.1
.08
.05
.04
.03
.02
.01
10 G
1 G
.1 G
.01 G
.001 G
.3
.2
.1
.08
.06
.03
.02
.01
VERY ROUGH
ROUGH
FAIR
GOOD
SMOOTH
VELOCITY
INCHES /SEC (PEAK)
100
200
500
1,000
2,000
5,000
10,000
20,000
50,000
100,000
FREQUENCY IN R.P.M.
PH. 614/876-1295

Figure 5-6

VIBRATION SEVERITY CHART

The Vibration Severity Chart is a composite of generally acceptable standards which are related to Displacement and Velocity readings.

The Displacement readings, those starting at the lower right hand side of the page and continuing up and from right to left across the top, have to be correlated with the operating speed to make a value judgement. For example, you can see that 1 mil at 1000 RPM falls into the smooth area, but 1 mil at 10,000 RPM falls into the rough area.

The Velocity readings, those on the left hand side, correspond roughly with the value judgements as a straight-line function. Velocity at 0.2 inches/second at 1000 RPM has the same basic value judgement as 0.2 inches/second at 10,000 RPM.

With this information in mind, it is recommended that the vibration readings for a vibration maintenance program be taken in velocity (inches per second). Normally there are several pieces of equipment to check all of which may be running at different speeds, if the readings are taken in Displacement, you would be required to refer back to the Severity Chart to interpret the displacement readings. Displacement readings must be compared to speed to evaluate the condition. When using Velocity readings one set of standards can be used for most of the equipment found in the plant. The possible exception to this velocity standard might be very heavy or very slow turning (below 500 RPM) rotors which may be better measured in the Displacement mode.

Referring to the Severity Chart, you can see that Velocity readings of 0.2 in/sec to 0.5 in/sec of vibration indicate further investigation and analysis.

VIBRATION IDENTIFICATION GUIDE

The Vibration Identification Guide is a list of vibration causes and how they are identified by frequency, phase and amplitude. The frequency of the vibration is the best guide to use to identify the source of vibration. Unbalance is the most common cause of vibration due to manufacturing and installation or wear and dirt buildup (mass unbalance). Mechanical misalignment or defective parts is the other common cause of vibration. A small percentage of vibration problems result from design faults (resonance, oil whirl, critical speeds).

The best correction technique for vibration is the identification and reduction or removal of the excitation force. Example: Vibration caused by mass unbalance (excitation force), the unbalance mass (weight) is removed (or reduced to an acceptable level).