

1980

A Method for Characterizing the Rigid Body Motion of Reciprocating Refrigerating Compressors

T. S. Katra

J. F. Crofoot

Follow this and additional works at: <https://docs.lib.purdue.edu/icec>

Katra, T. S. and Crofoot, J. F., "A Method for Characterizing the Rigid Body Motion of Reciprocating Refrigerating Compressors" (1980). *International Compressor Engineering Conference*. Paper 313.
<https://docs.lib.purdue.edu/icec/313>

This document has been made available through Purdue e-Pubs, a service of the Purdue University Libraries. Please contact epubs@purdue.edu for additional information.

Complete proceedings may be acquired in print and on CD-ROM directly from the Ray W. Herrick Laboratories at <https://engineering.purdue.edu/Herrick/Events/orderlit.html>

ABSTRACT

A METHOD FOR CHARACTERIZING THE RIGID BODY MOTION OF
RECIPROCATING REFRIGERATION COMPRESSORS

T.S. Katra
Sr. Project Eng., Acoustics/Dynamics
Carlyle Compressor Co.
Division of Carrier Corp.

J.F. Crofoot
Mechanical Eng., Dynamics
Research Div.
Carrier Corporation

Increasingly stringent requirements for low sound and vibration levels from the unitary air conditioning equipment which utilizes reciprocating refrigeration compressors have created a need for increased sophistication as regards the acoustic/dynamic interactions between compressors and the units in which they are installed. This is especially true for the rigid body vibration of welded hermetic compressors, because their compact, relatively lightweight character does not inherently require massive supporting structures, yet most applications are both noise and cost sensitive.

A necessary prerequisite for the application of modern analytical methods to the problem of compressor-unit structure interaction is a description of the compressor's motion in a dynamically complete form, compatible with the structural system models available. A method has been developed to meet this need which has the added advantage of flexibility, in that it also meets much less complex needs; for example, the amplitude of vibration for a particular point and direction (say, vertically at a mounting foot) can be readily extracted. This has been accomplished by creating a data base for each compressor model or family and describing the motion of the geometric center in the frequency domain for all six rigid body degrees of freedom with complex coefficients. The data base is then made available to prospective users (i.e., the unit designers) on a time-sharing computer network, together with an access program to manipulate the information into the desired form. This paper describes the method and its potential uses.