

**SECTION 03740**  
**STRUCTURAL ANALYSIS/VIBRATION CRITERIA**

**PART 1 – GENERAL**

**1.1 SUMMARY:**

- A. The project team will decide on the need for a vibration analysis for each project as early in the project as possible. Vibration analysis should be provided for buildings:
  - 1. Having a reciprocating machine, or an air-handling unit exceeding 5,000 CFM;
  - 2. Where equipment or foot-fall vibration will affect the use of the space or the occupants of the building;
  - 3. In buildings which may be used for other than storage.
- B. The UCB project team will consist of the Client and the Planning, Construction and Engineering Divisions of Facilities Management.

**1.2 QUALITY ASSURANCE:**

- A. When an analysis is determined to be appropriate it shall be done by a firm capable of performing predictive dynamic modeling of building structures based on finite-element analyses, multi-modal structural dynamics, etc. It is typically necessary to use a “total system” approach, wherein all of the vibratory components are included. The “total system” is described by the attached VIBR-2 and VIBR-3 schematics.
- B. The following criteria shall be used for vibration amplitudes and structural center-bay stiffness:
  - 1. Precision instrument areas:
    - Amplitude: less than 100 micro-inches (peak to peak)
    - Stiffness: greater than 1000 KIPS/inch
  - 2. Scientific laboratory areas
    - Amplitude: 100 to 300 micro-inches (peak to peak)
    - Stiffness: 300 to 1000 KIPS/inch
  - 3. Classroom and office areas:
    - Amplitude: 300 to 900 micro-inches (peak to peak)
    - Stiffness: 100 to 300 KIPS/inch

It is important to bear in mind that each building is a unique combination of shape, structure, use and equipment. As such, each should be analyzed to determine what will meet its specific requirements.

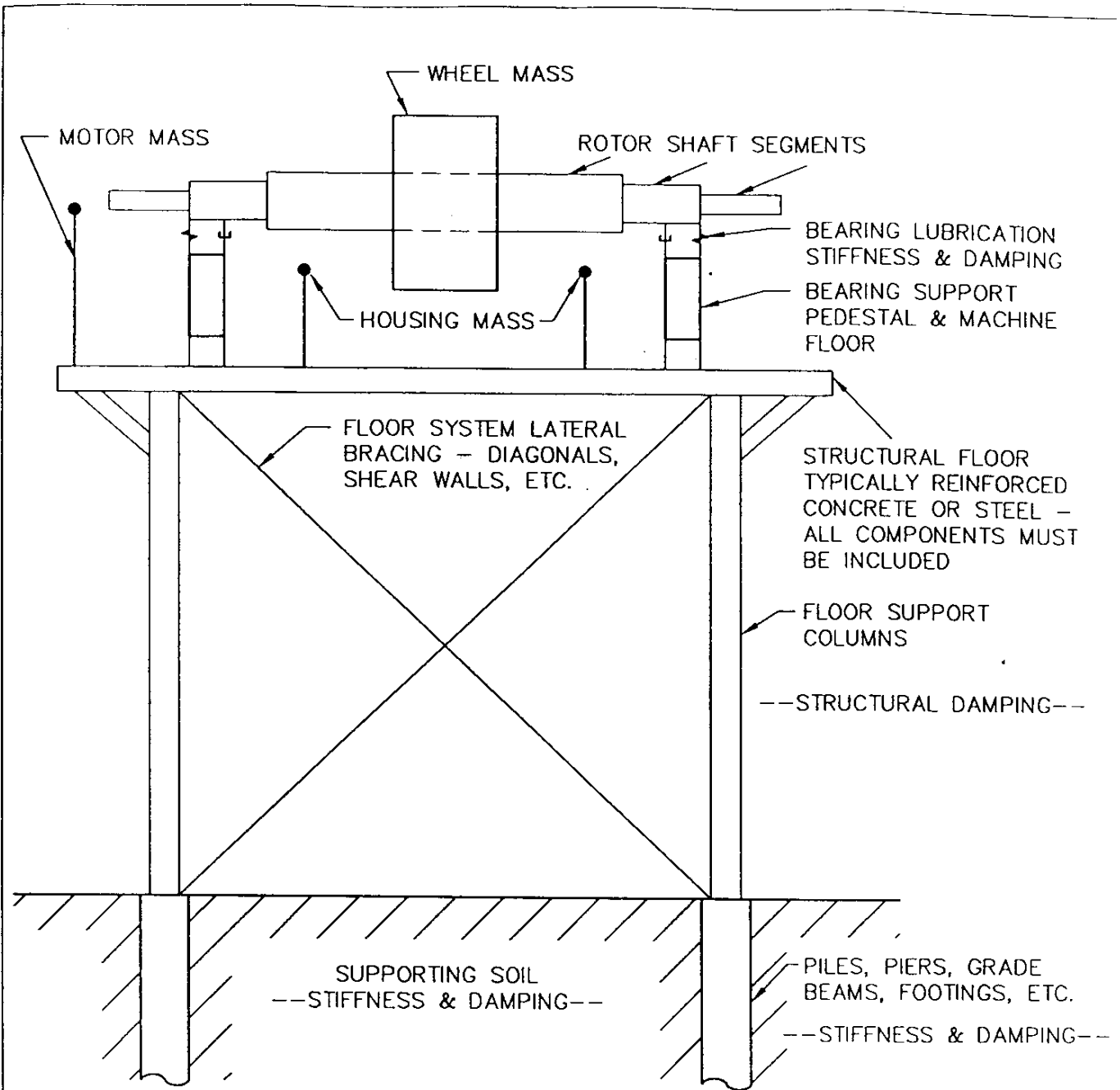
**PART 2 – EXECUTION**

Not used

**PART 3 – EXECUTION**

Not Used

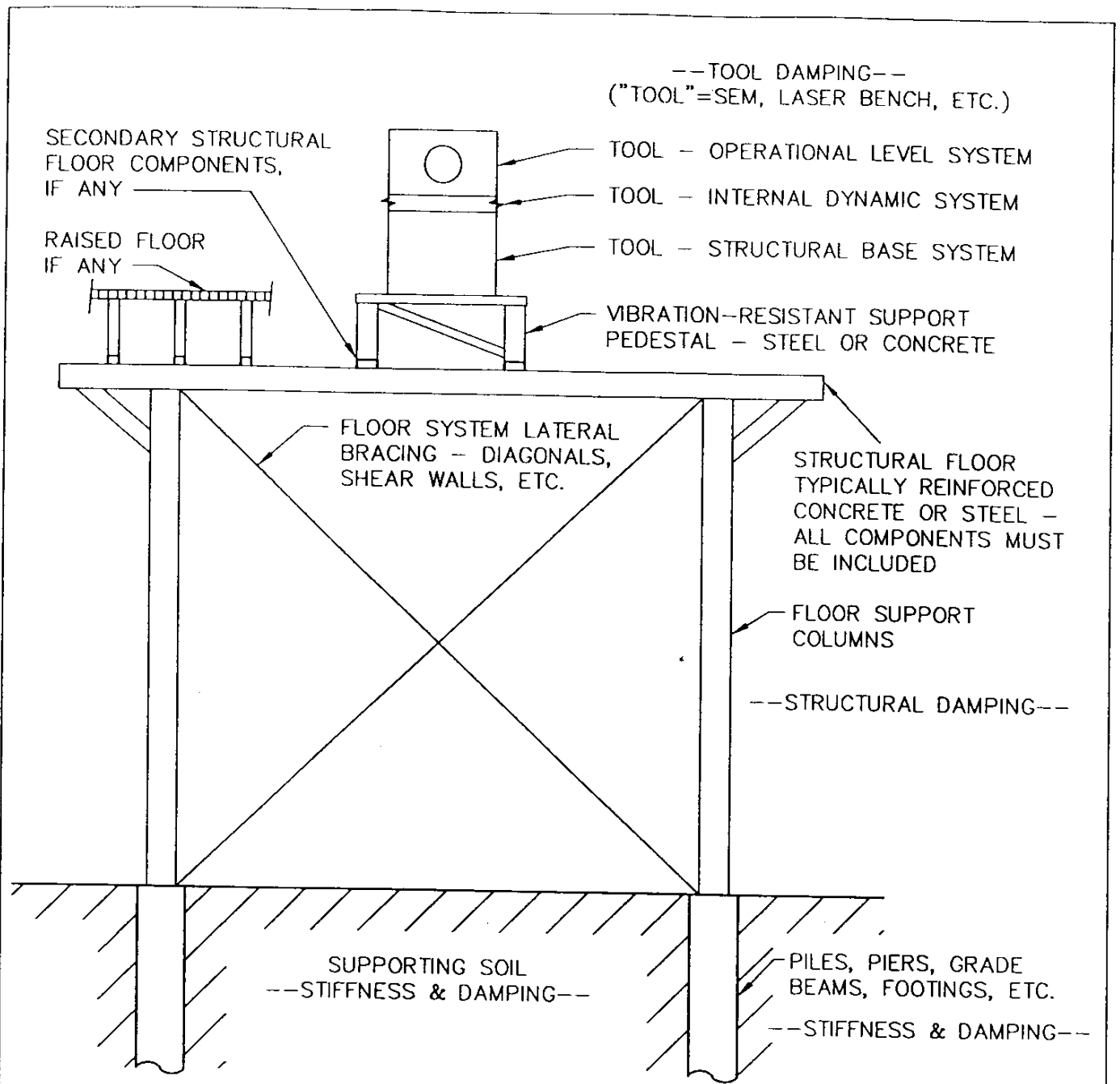
**END OF SECTION 03740**



ROTATING MACHINE - SUPPORT STRUCTURE -  
FOUNDATION COMPONENTS, INCLUDING DAMPING.

For evaluating the adequacy of the rotating machinery and its response to unbalanced loadings; also the response of the supporting floor system.

NOTE: The system must be modeled in 3 dimensions, i.e., x, y, and z responses computed and evaluated.



---TOOL DAMPING---  
 ("TOOL"=SEM, LASER BENCH, ETC.)

SECONDARY STRUCTURAL FLOOR COMPONENTS, IF ANY

RAISED FLOOR IF ANY

TOOL - OPERATIONAL LEVEL SYSTEM

TOOL - INTERNAL DYNAMIC SYSTEM

TOOL - STRUCTURAL BASE SYSTEM

VIBRATION-RESISTANT SUPPORT PEDESTAL - STEEL OR CONCRETE

FLOOR SYSTEM LATERAL BRACING - DIAGONALS, SHEAR WALLS, ETC.

STRUCTURAL FLOOR TYPICALLY REINFORCED CONCRETE OR STEEL - ALL COMPONENTS MUST BE INCLUDED

FLOOR SUPPORT COLUMNS

---STRUCTURAL DAMPING---

SUPPORTING SOIL  
 ---STIFFNESS & DAMPING---

PILES, PIERS, GRADE BEAMS, FOOTINGS, ETC.

---STIFFNESS & DAMPING---

TOOL - SUPPORT PEDESTAL - STRUCTURE -  
 FOUNDATION COMPONENTS, INCLUDING DAMPING.

For evaluating the dynamic motions of the tool and the response of the supporting floor system.

NOTE: The system must be modeled in 3 dimensions, i.e., x, y, and z responses computed and evaluated.