MECH 325 Reading Guide #3
Bearings and Shaft Components

Overview

The readings outlined in this guide are intended to prepare a foundation of knowledge and skills that will be used in the MECH 325 classes and tutorials.

This third reading assignment focuses on journal bearings, rolling element bearings and shaft components. This module has a large reading assignment, with approximately 22 pages of raw text (omitting examples, figures, and tables) in the required portion – plan your time accordingly. The readings are divided into two categories:

- **Required**: the primary source of material for the Readiness Assurance Process (RAP) Quiz. Each student is expected to complete the required readings.
- ***Beneficial:*** *additional analyses, derivations, explanations and examples to provide in-depth understanding of the course material. These readings help develop a more complete understanding of course concepts necessary for the tutorials, exercises, exams, and design projects. It up to you whether or not you do the beneficial readings. Some RAP questions do cover this portion of the readings.*

All readings are drawn from the course text: Budynas, R.G. and Nisbett, J.K., *Shigley's Mechanical Engineering Design*, McGraw-Hill. **11th Edition page numbers in bold**, 10th Edition in regular and 9 *th Edition in italics*.

2 Readings

2.1 Journal Bearings and Roller Bearing Introduction

Required: Sections 12-1 and 12-2 (pp. **624-27,** 610-3**,** *618-21*). This section identifies the different types of lubrication (and different classes of journal bearings) that are used.

Beneficial*: Sections 12-4 and 12-5 (*pp. **632-4,** 615-7**,** *623-5). These sections outline some of the principles of using lubricating films with journal bearings. Do not be concerned by the references to earlier sections – just try to get the gist of how the lubrication works.*

*Sections 12-13 and 12-14 (*pp. **661-3,** 644-6**,** *652-3). These sections outline some of the materials and types of journal bearings.*

Required: Section 12-15 (pp. **670-7,** 652-8, *660-6*). Boundary-lubricated bearings. Most of our attention will be paid to this class of sliding bearing. Read the text but do not concern yourself with the tables.

2.2 Rolling Element Bearings

Required: Section 11-1 (pp. **576-9,** 562-5**,** *570-3*). Types of rolling element bearings.

Required: Sections 11-2 to 11-5 (pp. **579-85,** 565-71**,** *573-9*). These sections relate to determining bearing life under different conditions. *There are many examples in these sections; they are beneficial but not required reading.*

Beneficial*: Sections 11-6 to 11-11 (*pp. **585-609,** 571-97**,** *579-604). These sections outline the bearing selection and assessment procedure. There are lots of examples and tables that will be helpful for your assignment.*

Required: Section 11-12 (pp. **609-13,** 597-601**,** *604-8*). Mounting and enclosure.

2.3 Shaft Accessories

Beneficial*: Section 7-3 (shaft layout) is not covered in MECH 325, but would be useful to review prior to beginning the readings below.*

Required: Section 7-7 (pp. **380-6**, 388-94, *376-82*) covers the accessories used to attach devices to shafts.

Beneficial*: Section 7-8 (Limits and Fits) This topic will be highlighted in the proper fitting of bearings and components on shafts.*