Beam Pumping

OIL AND GAS PRODUCTION

PETEX

Contents

How to Use This Manual

The format of this manual includes a set of specific objectives for each section; at the end of the section is a competency self-test. To get maximum benefit from the manual, read the specific objectives carefully before studying the material in each section. As you study the material in the section, take notes, using the objectives as a guide to the most important parts.

When you feel that you have mastered the objectives, begin the self-test. Since it is a self-test, *you* decide whether you should refer back to the material to answer the questions by determining how important that section is to your work. If you feel that you need to be very competent in an area, do not refer back until you have finished the test. This way, using the scoring points given at the beginning of the test, you can determine your percentage of competency. Score the test by using the corresponding key provided at the end of this manual.

1

Surface Equipment

OBJECTIVES

Upon completion of this section, the student will be able to:

1. Describe effective design of the flow lines and wellhead equipment for a beam pumping system.
2. List the major components of a beam pumping unit.
3. Explain how beam pumping unit sizes are designated by the API.
4. Describe the structural components of a beam pumping unit and explain what they must do.
5. List the three major bearings on a beam pumping unit and describe the load each carries.
6. Explain the function and proper maintenance of the speed reducer.
7. Enumerate the factors to be considered in choosing a prime mover for a beam pumping unit.
8. Explain why the counterbalance system of a beam pumping unit is so important.
9. Explain the function of controllers used for beam pumping units and list the types of controllers available.

2

Subsurface Equipment

OBJECTIVES

Upon completion of this section, the student will be able to–

1. List the factors that should determine the selection of sucker rod pump size, stroke length, and stroke rate.
2. List the factors to be considered in selecting a sucker rod pump design.
3. Describe the two categories of pump plungers.
4. Explain what factors should be considered in selecting pump valves to suit individual well conditions.
5. Describe the methods for separating gas from oil or oil and water before fluids are taken into the sucker rod pump.
6. List the kinds of API sucker rods and the kinds of non-API sucker rods.
7. Explain why tapered sucker rod strings are used.
8. Explain what conditions make sucker rod string failure probable.
9. Describe the factors that are most important in designing a tubing string to protect the casing.

3

Pump Installation Design and Operation

OBJECTIVES

Upon completion of this section, the student will be able to–

1. Describe the considerations involved in designing a sucker rod pumping installation.
2. Discuss the effects of rod motion and inertia on sucker rod loading.
3. Explain what the impulse factor is and how it can be calculated.
4. Describe the effects of rod elasticity on pumping system design.
5. Explain the significance of the torque factor from a pumping unit designer's standpoint and from an operating standpoint.
6. Discuss the effects of dimensionless speed and dimensionless load on dynamometer cards.
7. Describe the design method produced by Sucker Rod Pumping Research Incorporated and published as API RP 11L.

To obtain additional training materials, contact:

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