

# Automotive Technology 6<sup>th</sup> Edition

## Chapter 32 – Camshaft and Valve Trains

### Lesson Plan



#### **CHAPTER SUMMARY:**

1. Camshaft design, camshaft drives, and camshaft movement
  2. Rocker arms, pushrods, and lifters or tappets
  3. Overhead camshaft trains, valve train lubrication, and valve train problem diagnosis
  4. Camshaft specifications, camshaft removal, and measuring camshafts
  5. Selecting camshafts, variable valve timing, variable lift, and cylinder deactivation systems
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#### **OBJECTIVES:**

1. Describe the purpose and function of camshaft and camshaft design.
  2. Discuss camshaft drives and camshaft movement.
  3. Discuss rocker arms, pushrods, and lifters or tappets.
  4. Explain overhead camshaft valve trains, their lubrication, and problem diagnosis.
  5. Explain camshaft specifications.
  6. Explain how to remove, measure, and select a camshaft.
  7. Explain variable valve timing, and variable lift and cylinder deactivation systems.
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**RESOURCES:** (All resources may be found at <http://www.jameshalderman.com>)

1. **Task Sheet ASE (A1-A-2) P-1:** Camshaft Specification
  2. **Task Sheet ASE (A1-B-3) P-2:** Valve Train Inspection
  3. **Task Sheet ASE (A1-B-12) P-2:** Valve Lifter Inspection
  4. **Task Sheet ASE (A1-B-4) P-3:** Valve Adjustment
  5. **Task Sheet ASE (A1-B-13) P-3:** Camshaft Inspection
  6. **Task Sheet ASE (A1-B-14) P-3, (A1-C-6) P-3:** Camshaft Bearing Surface Inspection
  7. **Task Sheet ASE (A1-B-6) P-1, (A8-A-11) P-1:** Camshaft Position Sensor
  8. Chapter PowerPoint
  9. Chapter Crossword Puzzle and Word Search
  10. Animations: Camshaft & Flat Lifter, Camshaft & Roller Lifter, and Camshaft Runout Check
  11. Animations: Rocker Arm Ratio and VVT Operation
  12. Videos: See list at the end of the lesson plan.
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#### **ACTIVITIES:**

1. **Task Sheet ASE (A1-A-2) P-1:** Have students complete Camshaft Specification Task Sheet.
  2. **Task Sheet ASE (A1-B-3) P-2:** Have students complete Valve Train Inspection Task Sheet.
  3. **Task Sheet ASE (A1-B-12) P-2:** Have students complete Valve Lifter Inspection Task Sheet.
  4. **Task Sheet ASE (A1-B-4) P-3:** Have students complete Valve Adjustment Task Sheet.
  5. **Task Sheet ASE (A1-B-13) P-3:** Have students complete Camshaft Inspection Task Sheet.
  6. **Task Sheet ASE (A1-B-14) P-3, (A1-C-6) P-3:** Have students complete Camshaft Bearing Surface Inspection Task Sheet.
  7. **Task Sheet ASE (A1-B-6) P-1, (A8-A-11) P-1:** Have students complete Camshaft Position Sensor Task Sheet.
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#### **ASSIGNMENTS:**

1. Chapter crossword and word search puzzles.
  2. Complete end of chapter 10 question quiz.
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#### **CLASS DISCUSSION:**

1. Review and group discussion chapter Frequently Asked Questions and Tech Tips sections.
  2. Review and group discussion of the five (5) chapter Review Questions.
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#### **NOTES AND EVALUATION:**

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#### **Videos:** (at <http://www.jameshalderman.com>)

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| Timing belt removal (time 7:50)                       | Lifter operation (time 1:28)                     |
| Timing belt inspection (time 7:53)                    | Valve adjustment (time 8:04)                     |
| Timing belts explained (time 6:29)                    | Toyota VVTiE (time 3:02)                         |
| Camshaft sensor indexing (time 2:26)                  | Variable cam timing (time 4:32)                  |
| Valve spring replacement (time 7:36)                  | Timing gears 1 (time 4:46)                       |
| Valve spring height measurement (time 15:49)          | Timing gears 2 (time 6:39)                       |
| Valve adjustment (time 1:39)                          | Timing gears 3 (time 9:14)                       |
| Checking valve to piston clearance part 1 (time 2:53) | Camshaft break in (time 1:56)                    |
| Checking valve to piston clearance part 2 (time 4:01) | How to check and notice bad camshaft (time 6:24) |
| Lifter (time 1:28)                                    | Variable valve timing explained (time 3:52)      |
| Variable valve timing (time 0:41)                     | Cylinder deactivation (time 2:35)                |
| Variable valve timing (time 2:06)                     | Camshaft bearing wear inspection (time 0:43)     |
| Variable valve timing (time 3:38)                     | Honda V-TEC pressure switch (time 1:43)          |
| Degree a camshaft (time 1:30)                         | Honda V-TEC solenoid (time 3:07)                 |
| Degree a camshaft (time 3:19)                         | Honda V-TEC operation (time 3:30)                |

