

Comparison of SOPEEC and SAM Syllabi

The SOPEEC syllabus contains a section on objectives and a section on topics to be examined. There is no consistency between the items listed in the objectives and the items listed in topics, although there is some overlap.

Objectives

The SOPEEC syllabus contains 14 objectives. They are given here along with references to the SAM syllabus.

SOPEEC	SAM
a. Legislation of the governing jurisdiction	1.2 Licensing Requirements 2.18 Boiler law and regulations
b. Basic calculations	2.3.3 Boiler construction
c. Types of Boilers	2.3.1 Types of boilers
d. Process for determining the maximum allowable pressure allowed in the boiler	2.3.3 Boiler Construction 2.15 Inspection
e. Operation	1.3 Hands-on Experience 2.7.3 Typical Components of Traction Engines 2.7.4 Controlling Motion and Power of a Reciprocating Steam Engine 2.8.1 Crew Preparation for a New Engine 2.8.2 Crew Preparation for the Day's Operation 2.10 Firing 2.11 Handling an Engine 2.12 Belting Up, Hitching and Maneuvering 2.13 Emergency Procedures 2.14 Shutdown
f. Inspection	2.15 Inspection
g. Non destructive testing	2.15 Inspection
h. Pressure testing	2.15 Inspection
i. Certification	2.18 Boiler law and regulations
j. Controls and Safety Devices	2.3.2 Five safety features on a boiler 2.4 Items Attached to the Boiler 2.5 Piping, Fittings and Valves 2.7.3 Typical Components of Traction Engines 2.7.4 Controlling Motion and Power of a Reciprocating Steam Engine
k. Pressure relief devices	2.3.2 Five safety features on a boiler
l. Water treatment and maintenance of water treatment	2.6 Boiler Water Treatment
m. Causes of Corrosion	2.6 Boiler Water Treatment
n. Repair requirements	2.16 Repairs and Modifications

Items in SAM syllabus missing from SOPEEC objectives

2.1 Parts of a Steam Traction Engine

- 2.2 Properties of Water and Steam
 - 2.7.1 Types of Steam Engines
 - 2.7.2 Determining Power Output
 - 2.7.3 Typical Components of Traction Engines
- 2.9 Lubrication
- 2.17 Documentation
 - 2.17.1 Engine Documentation
 - 2.17.2 Log Books

Topics

The SOPEEC Syllabus contains a list of topics upon which the examination is based. Note there is no reference to a driving test, although there are some operational considerations that clearly fall in the category of driving.

1.0 Legislation

All of the topics listed in this SOPEEC section are covered in the SAM syllabus. Note that SOPEEC refers to CSA B51 and ASME Section VII here, and allows the former in the list of items allowed in the examination room but specifically prohibits the latter. Also, the exam list includes CSA B52 (Mechanical Refrigeration Code) which has no bearing on traction steam engine operation.

1.1 (Missing)

1.2 Safety – this is a comprehensive and worthy list.

1.3 Calculations – Engine horsepower and heating surface are necessary; conversion from Imperial to Metric units has no bearing on engines designed in an era when only Imperial units were used. There is no reference here to boiler calculations, although they show up somewhat obliquely under 1.6 Inspection as “principles”. Also note that in reality MAWP calculations are performed by a professional engineer, not an operating engineer.

1.4 Thermodynamics – OK

1.5 Boilers – 1.5.h some of the items listed as Auxiliary Components have nothing to do with boilers, being engine parts; these should be relocated to 1.10 steam engines. 1.5.q Thermal stress should include pressure stress, as induced by hydrostatic testing, as well as operational stress under pressure. In addition, to meet Objective B Basic Calculations, this section should contain a definitive list of boiler formulae for stayed surfaces, riveted seams, back and front heads, etc. that apply to traction steam boilers.

1.6 Inspection – item a. the Manufacturers Data Report is unavailable in the majority of cases and has been replaced by NBIC Initial Inspection Report. Item 1.6.k. the hammer test has been explicitly deleted from NBIC. Item 1.6.j Riveted joints should be relocated to 1.5 Boilers since “advantages and disadvantages” relates more closely to construction than inspection.

1.7 Operation – 1.7.a Pressure relief valve: the list of attributes should include criteria for capacity sizing. As well, most of these attributes should be under 1.7 Inspection, since that is where they are checked.

1.7.r Stopping should include emergency stop. Missing in 1.7: use of pressure regulating valve in addition to pressure relief valve, glass blowdown procedure, try cock procedure

1.8 Testing – 1.7.a should include rate of pressure changes (e.g. 5 psi per minute) during hydro as well as recommended test pressure ($1.25 * MAWP$). This entire section should be incorporated under 1.6 Inspection.

1.9 OK

1.10 – 1.10.f should include lubricators (hydrostatic vs pump) and their methods of delivering lubrication under pressure as well as the properties of steam cylinder oil. 1.10.l Friction clutch should include pinned clutch; there is no mention of multiple gear ratios (admittedly, not common). This section should also include traction gearing: intermediate, differential, cross shaft, pinion, bull gear. There is no reference to side mount versus rear mount transmission systems, nor to load bearing devices (hitches) and how their design affects the use to which a traction engine can be put.

1.11 Emergency Procedures – should include banking or pulling a fire