

Profile and alignment, cross sections.
 Grade contours, compiled profile.
 Approximate quantities.
 Actual locations—Tangents, curves, gradients.
 Limit of accuracy desirable.
 Reduction of quantities of work by successive improvements of a location.
 Balancing the excavations and embankments.
 Burrowing, wasting.
 Engineering office work.
 Plans, profiles, cross sections, estimate of quantities off the sections.
 General drawings for structures.
 Special drawing for each structure to suit local circumstances.
 Estimate of gross cost.
 Monthly measurements, estimates and returns.

The foregoing course of railway engineering is performed by the cadets in the field, by their running trial and location surveys, exactly the same as if they were in actual service, and the office work is performed in the same manner.

(B)—*Construction and Design in Wood, Stone, Earth, &c.*

Marks.....Examinations, 900.

Carpentry—Framing of wood-work, mortised, scarfed, halved, &c., joints.

Built up beams.

Brick-work—bond-string courses, chimneys mensuration.

Mason-work.

This comprises a full course of instruction on the specifications for the various classes of mason work used on the Government Railway Works of Canada, and is supplemented by excursions to inspect and explain existing railway structures on the Intercolonial or other railways.

Construction of the mason work of bridge piers and abutments, and culverts and cattle guards.

Designing the dimensions at base and top of piers and abutments, and the length of abutments and thickness of retaining walls.

Difference between "wing wall" abutments and "tower" abutments.

Methods of finding length of wing walls.

Methods of finding lengths of inclined or stream culverts on sloping or on level ground by the following methods:—1. Experimentally. 2. By analytical geometry. 3. Graphically.

Principles of economizing mason work in culverts, by reducing their lengths, by use of wing walls and coping, &c., &c.

Principles of economizing masonry in abutments by using cells and wells.

Foundations of structures.

General explanations of the nature of materials met with in forming foundations.

Principles governing the permanence of foundations, settling, scour, frost, springs, piling, platforms, concrete, sand piles, foundations under water.

Copper dams, caissons, pneumatic processes.

Designing and executing earth and rock excavations and embankments, tunnels, slopes, ditches, drainage, fencing snow.

Crib-work, rip-rap, stream diversions.

Railway permanent way, ballast, ties, rails, track laying, guages, sidings, switches, stations.

Common roads or highways, surveys, gradients, cross section, line excavation, drainage, road bed, suitable materials for metalling, traction.