

Rails—principles governing rail section and distance from points of support designing of a rail section, weight per yard.

Rail joints—spliced, fished, chaired or scabbarded, suspended and supported joints. The bridge joint the best. Steel compared with iron rails.

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

COMMON ROADS AND STREETS.

Uses—Freighting; travel; mails; intercommunication; outlets; commerce; settlement; defence. Colonization is dependent upon and is gauged by the road systems of a country.

Terms—Trunk road; high road; main road; bye road; occupation road; trail.

Routes are decided by reasons topographical, military, agricultural, commercial.

Dimensions—Tables of existing roads and streets; necessities always affecting dimensions; necessities occasionally affecting size of roads.

Surveys—Plans; estimates; reports and staff for constructing common roads are much the same as for railways of the same length.

Gradients of common roads for ascending traffic, and gradients for descending traffic; co-efficients of friction for different road surfaces; co-efficients of draught for a horse at different speeds.

Destructive agents for roads—frost; water; wind; traffic; weights; widths of tires of wheels.

Drainage of water and snow; surface water to run off; sub-water to be sucked away by low drainage; water line to be maintained not less than three feet below road surface in order to have durable road.

Road-bed and road metal.

Cross section—crowning, and footways and side ditches.

Telford's road-bed; Roman road-beds. Macadams road-bed.

Metalling—earth, gravel, broken stone; stone pavement, wood pavement, asphalt pavement, planks, corduroys.

Streets—drainage, dimensions, gradients, alignments, diagonal thoroughfares, rectangular laying off of cities, circular or concentric laying off of cities.

Systems of maintaining the common roads of a country.

Governmental, municipal, corporated individuals.