steel plants runs from about 90 to 130% of the shop labor. In one plant at which the writer has had experience, the percentage was placed at 125%, which is shown on the example.

The "shop cost analysis sheet" (Fig. 5) is for a certain part of a job when the manager wishes to know exactly what it costs him for laying out, shearing, punching, or fitting, etc., on a plate girder or built-up column section, etc.

If the time sheets are made out correctly, the cost clerk will experience no difficulty in finding out the required information a month or so after the work has been

SUMMARY-COST-SHEET.

NAME Thompson Ltd.

ADDRESS 32 Lansing Ave. CONTRACT-Nº 285

ARTICLE	WEIGHT	@	AMT.	CLASS-OF-LABOR	AMT.
Steel	2000	1.60	32.00	Draughting	1.45
Bar-Iron (Baines & Co.)			3.67	Pattern	
Bolts			.70	Shop = 16% + 12.5%	36.90
Cast-Iron				Field	
Pipe (Separators)			.35	Cartage	1.55
Checkered-Plate (Bell & Co.)			2.38	Freight	
TOTAL			39.10	TOTAL	49.90
				MATERIAL	39.10
				LABOR	49.90
				GRAND-TOTAL	89.00

(Binding page)

Fig. 4.

turned out of the shop. The sheet shows practically all the necessary operations in a structural steel shop, from draughting to painting, and may also be used for the analysis of complete jobs.

The last illustration is that of the "erection cost analysis sheet," which is generally used for complete jobs. The manager can see from this sheet what it costs for the erection of the columns, beams, trusses, etc., of a job, and can then figure his rates for estimating purposes. There are columns allowed for the various rates of labor, which may be employed on the job. Both these "analysis" sheets have a space at the top for the description of the article or contract.

SAINT JOHN, N.B., RAILWAY COMPANY.

According to the report for 1914 of the St. John Railway Company, the following works were carried through during the year:—

Extension of railway from Kane's Corner to Crouchville, and from the One Mile House past Rural Cemetery to Coldbrook and Glen Falls, in all 3¼ miles. They also built another fireproof car barn on Wentworth Street, size 58′ x 213′; laid 2,500′ of gas mains and installed 236 gas ranges and appliances; and purchased 12 new semi-convertible cars with equipment.

Blister copper to the extent of 22,000,000 pounds was produced last year by one smelting company operating in British Columbia.

Permits have recently been issued in Winnipeg for forty-two apartment blocks, the aggregate estimated cost of which is $2,488,500.

Railway mileage in Alberta is apportioned to the different companies as follows:—C.P.R., 1,887; C.N.R., 1,188; G.T.P., 707; E.D. and B.C., 240; A. and G.W., 75. In 1905 the only mileage was held by the C.P.R., and amounted to 1,060.

STUDIES IN ROAD CONSTRUCTION.

(Continued from last Issue.)

REGULATIONS OF THE DEPARTMENT RESPECTING COUNTY ROADS. By W. A. McLean, Chief Engineer of Highways, Ontario.

Mr. McLean dwelt in an explanatory way upon a number of the regulations of the public works department with respect to road systems, upon compliance with which the counties of Ontario become entitled to the provincial grant of one-third of the cost of construction. He showed clearly that the details of construction for all roads could not conform to a schedule form or fixed plan, but that they must be in accord with principles. The value of keeping accurate accounts and returning proper statements to the departments were strongly emphasized. Stress was laid upon the establishment of permanent grade and the earthwork involved therein and upon the importance of surface drainage. Relative to the purchase of suitable machinery, it was stated that the stone crushers which counties had purchased were, in some instances, too small. It was observed that there was considerable economy in having a stone crushing plant capable of supplying about 100 cubic yards per day. As a guide to the counties, the Department's approval should be obtained in the purchase of machinery.

Concerning the construction of bridges, the necessity of sound engineering advice was emphasized. The services of a bridge engineer were very necessary if the road superintendent was not an engineer.

Mr. McLean explained the system of inspection which the Department had adopted. It was clearly shown that the object in view was to place its staff of engineers at the service of the county superintendents to be of as much assistance to them in their work as possible.

TRAFFIC AND MODERN ROAD CONSTRUCTION. By R. C. Muir, A.M.Inst.C.E., assistant engineer, Ontario Office of Public Highways.

The author showed that traffic is a primary factor governing the selection of the type of construction to be employed on a road and affecting its width, grade, crown, foundation and type of surface. He divided it into three classes: Horse-drawn vehicles, fast motor traffic and heavy motor or horse-drawn vehicles. He pointed out that roads must be built according to the traffic that will be developed by improvement and the potential traffic of expanding local conditions. A knowledge of this traffic is indispensable to the road engineer.

It was shown what effect the width of tires had upon the road surface. The author expressed his opinion that for light vehicles the width should not exceed 2½ inches or be less than 2 inches. Wheels of large diameter did less damage than those of small diameter, and a 2-wheeled vehicle did more damage than one with four wheels owing to sudden and irregular twisting motion. It was also shown that springs materially decreased the resistance to traffic, and diminished the wear of the road, especially at speeds beyond a walking pace.

He claimed that the theory had never been substantiated respecting the destructive force of motor car wheels at high speeds being due to suction underneath the tires. The accepted theory was that the destructive agent is a shearing force developed between the wheel and the road, causing the wheel to act as a grind stone on the surface.