

has been considered necessary, by the processes of swaging, rolling or drawing, but that a very small amount of energy will suffice when applied in the manner described in this article.

COMPARATIVE COST OF PRODUCING COPPER SHEETS AND WIRE

In Fig. 9 is given the comparative cost of producing copper sheets by the process of smelting, refining, casting, and rolling, as compared with the centrifugal process.

In Fig. 10 is given the comparative cost of producing wire by the ordinary process of smelting, refining, rolling, and drawing, and the centrifugal process.

The capital expenditure of a plant for the centrifugal process both for the manufacture of sheets, tubes and wire, compares very favorably with an up-to-date rolling mill and wire drawing plant. The cost of such a plant, with buildings, is about £80,000 for an output of 100 tons per week of 5,000 tons per year. The following is an estimate

of the cost of a plant for the centrifugal process capable of dealing with 10,000 tons of tubes, sheets, and wire per annum:—

ESTIMATED COST OF PLANT FOR PRODUCING 10,000 TONS OF TUBES, SHEETS, AND WIRE PER ANNUM BY THE CENTRIFUGAL PROCESS.

	£	s.	d.
Cost of 95 vats and accessories.....	60,000	0	0
Machinery for finishing tubes, sheets and wire.....	5,000	0	0
Cranes and lifting gear.....	1,500	0	0
Building.....	15,000	0	0
Plant for mandrel-making.....	2,000	0	0
Machinery for fitting shop.....	1,500	0	0
Pumps, atomizers, filter tanks.....	5,000	0	0
Driving machinery for vats.....	5,000	0	0
Conductors and electrolyte.....	5,000	0	0
	£104,000	0	0
Floating capital for copper.....	30,000	0	0
	£134,000	0	0

ESTIMATE OF COST PER TON OF PRODUCING COPPER TUBES, SHEETS, AND WIRE BY THE CENTRIFUGAL PROCESS DIRECT FROM CRUDE COPPER.

	£	s.	d.
Power per ton (2,240 lbs.) 1,015 k.w. hours at 0.275d per k.w. .	1	2	2
Wages at 8d. per hour, 18½ hrs	12	4	
Management.....	5	0	
Interest on copper lock-up.....	1	0	
Depreciation on plant and building.....	10	0	
Heating electrolyte.....	1	0	
Finishing and gauging.....	5	0	
Cost per ton.....	£ 2	16	6

These figures represent the actual working cost on which there would be a further reduction of the previous metals recovered, and if £1 10s. be deducted from the above cost, which may be taken as an average difference between Chili-bar and electrolytic copper, the cost per ton is reduced to £1 6s. 6d.

Data About Foundry Accidents Wanted

The American Foundrymen's Association at the Toronto Convention in June, 1908, Appointed a Committee to Work Towards the Prevention of Accidents in Foundries. The Writer of this Article is the Chairman of this Committee, and L. L. Anthes, Toronto, President of the A.F.A. is the Canadian Representative to the Committee. The Desire at Present is to Secure Data Regarding the Underlying Causes of Accidents. Canadian Manufacturers are Urgently Requested to Take an Active Interest.

BY THOMAS D. WEST.

There is no effort more worthy of recognition and every support, than that of the prevention of accidents. The foundry, whether iron, steel, malleable or brass, is as liable to have mishaps that will maim, kill and destroy property as with other industries. There are very few, if any lines of manufacture, or commercial business that is not interested at the present day in the prevention of accidents.

The writer's efforts in this work while dating back a couple of years, are most noticeable of results, commencing with the paper he read before this Association January 8, 1908, and the founding of the American Anti-Accident Association in Sharpville, the 22nd of that month.

The grounds for commendable achievements to prevent accidents in our foundries was so strongly urged by the writer at the American Foundrymen's Association's convention at Toronto, last June, as to result in the appointment of a committee consisting of the following gentlemen, to labor for the cause:

L. L. Anthes, president American Foundrymen's Association, Toronto, Canada; Dr. Richard Moldenke, secretary American Foundrymen's Association, Watchung, N.J.; Howard Evans, secretary Philadelphia Foundrymen's Association, Philadelphia, Pa.; F. H. Zimmers, secretary Pittsburgh Foundrymen's Association, Pittsburgh, Pa.; Frederick F. Stockwell, secretary New England Foundrymen's Association, Boston, Mass.; C. E. Hoyt, secretary Associated Foundry Foremen's Association, Chicago, Ill.; James H. Beans, secretary Centre Foundry & Machine Co., Wheeling, W. Va.; W. J. Spencer,

M.E., 712 Girard Trust Building, Philadelphia, Pa.; Thomas D. West, chairman, Sharpville, Pa.

The character of the men composing the above committee is evidence that no effort will be countenanced that are not just to employer and employee alike, with a sole aim to best prevent accidents, all that is practical.

The cause of accidents are chargeable chiefly to: 1. Sheer carelessness. 2. Intoxicants. 3. Smoking. 4. Inattention to surroundings. 5. The improper use or disregard of safety devices. 6. Disregard of rules or orders. 7. Disrespect for consistent authority and discipline. 8. Taking chances. 9. Inferior workmanship, machinery, etc.

The first move being made by the above committee to forward its work lies in making efforts to obtain statistics as to what accidents are caused through each of the above respective factors. We have good data as to how accidents happen, but as to the underlying cause shown in the above nine and other like factors, little or none exists in a way that can be of real service in assisting any individual, firms, societies or legislative bodies to rightly designate a remedy. The knowledge of underlying causes is as essential in the question of best preventing accidents as in the remedying of defective machinery, or other industrial affairs of life.

One unfortunate feature of this whole subject that has to be righted lies in the narrow view many entertain. Instead of studying to learn what is really at the root of our country's deplorable accidents, all with a view of best preventing them, it is a tirade with many on employer's being

fierce after profits and too inhuman to install safety devices, or in other words, the employer is wholly to blame, should pay all the costs, and is expected to stop accidents.

This error is leading many employees and others to expect public support in their theory that safety devices and actions of employers are the only essentials needed in the prevention of accidents. This causes many to say, in a figurative way to proprietors, put in your safety devices, but do not attempt to load us with any care, responsibility or worry in order to help you to prevent accidents.

Founders will bear with the writer on stepping outside of their provinces with this paper, as what may be done in this respect is largely due to the fact that there is much that lies with the general public and other trades which effect the inner workings of our foundries, and while we assist the outside or other industries, we can the better bring about the conditions that should prevail in our shops.

Great harm is being done in having the opinions prevail that the want of safety devices is the chief cause of all our accidents. There is much benefit that is yet to be derived by the installation of safety devices, and wherever it is possible of their decreasing our accidents, they should be installed. Before proceeding further we will consider how far safety devices can be expected to be utilized in preventing accidents.

According to statistics of Dr. Joseph Strong, in his "Social Progress," we had of the 76,000,000 population for 1900, the following citizens being engaged in gainful occupations: