A method of complex improvement of the operation of foundries has been proposed by the All-Union Scientific-Research Institute of Equipment-Manufacturing Technology with the objective of increasing the efficiency of manufacturing in operating foundries in the chemical and petroleum engineering area.

The complex improvement of operation of working foundries is effected in three stages (see Fig. 1): stage I, performance of preparative operations; stage II, improvement in the organization of manufacturing and control, and improvement in the technological processes used; stage III, introduction of new technological processes and means of mechanization.

The efficiency of this method has been confirmed in its introduction in the Kurgansk and Blagoveshchensk equipment plants, in the "Moldavigromash" PO, and in the "Tambovpolimermash" plant (Table 1). During a single year, the output of castings in these plants rose by 20-40%, the output of castings per worker increased by 20-30%, the cost of 1 ton of acceptable castings decreased by 10-25%, and the amount of reject castings decreased by 10-50%.

The fundamental feature of organization of work on introduction of the complex method should be considered its introduction directly in the plant, with constant contact of the specialists of the plant and institute.

In the preparative work stage, a group of co-workers of the institute (casting technologists and specialists on casting equipment) makes an analysis of the state of manufacturing in the plant. As a result of an all-around study, a plan of organization and technical measure (OTM) is developed, discussed, and enunciated, which appears in plant orders on improving the operation of the casting works as an appendix. In the order the make-up of the central commission which organizes the entire course of work is indicated. In the make-up of the commission are included the directors of services and plant works, and also the director of operations and the responsible executives from the institute. The director or chief engineer of the plant is appointed president of the commission.

After an analysis of the content and volume of work, and of the plan of measures, a chart of assignments is developed and the compositions of the crews of institute specialists who go out in the plant are determined. Each of the persons included in the make-up of the crew receives thorough instruction from the director about his obligations, orders of the day, and features of the organization of work, etc.

Tentatively, the duration of work in stage I is 1-1.5 months.

The work in stage II is the most complex, arduous, and intensive; it requires high organizational and professional abilities from each specialist of the crew of the institute. Assignment of functions in the crew of specialists of the institute in stage II is carried out as follows: the director of the crew directs the work and coordinates the action of the specialists of the institute and plant; the casting-technologists (5-7 men) perform operative direction of current manufacturing and are concerned with the introduction of measures which do not require large expenditures in the melting, mix-preparing, core, molding, and trimming and cleaning sections; a specialist on casting equipment directs improvement in the operation of repair services; the assistant to the director of the crew on manufacturing is responsible for improvement in planning and preparation of manufacturing, improvement in the operation of technological and economic services, and controls operative direction of current manufacturing and the improvement of technology which is carried out in sections of the plant by specialists of the institute; and the specialist on control organization is concerned with improvement in the operation of control service.

The most important of the operations in stage II is operative direction of current manufacturing and improvement in the operation of repair services. The specialists of the institute who perform these operations have a strictly regulated order of the day.

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### Complex improvement of operation of working foundry

**Stage I**
- Analysis of state of manufacturing
- Development of first wording of OTM plan
- Discussion and announcement of OTM plan
- Printing of order for plant
- Setting up operation chart and composition of institute crew
- Preparation of institute crew for work

**Stage II**
- Operative direction of current manufacturing
- Improvement in technology
- Improvement in operation of repair services
- Strengthening and improvement in operation of control services
- Improvement in planning and training for manufacturing
- Improvement in operation of technological and economic services
- Improvement in operation of control services

**Stage III**
- Development of technical documentation
- Preparation and acquisition of equipment and fittings
- Construction and mounting work
- Introduction of new technological processes and means of mechanization

**Fig. 1. Scheme of complex improvement in operation of working foundry.**

Solution of not only organizational but also of technological questions enters into the list of obligations of the casting technologists who are assigned the manufacturing sections. The level of performance of the shift assignment by this section is the basic criterion for evaluation of the operation of the institute casting technologist.

Responsibility for the downtime of equipment, the quality and timely organization of repair operations, and the assurance of spare parts is placed on the casting equipment specialist.

In the stage in question, special attention is paid to reaching a mutual understanding between the plant and institute workers. High requirements on being able to work with people are imposed on the specialists of the institute; his obligation is not a backing up of the actions of the control personnel in the plant, but an offering of operative practical aid in adopting organizational and technical engineering solutions in current manufacturing.

The deputy crew director effects coordination of the work of manufacturing sections. Through his mediation, discussion of individual current questions (material, transport, instrumental provision, etc.) is carried out in conferences of the central commission.

The duration of the work of each crew in stage II takes up three or four weeks. The workers in the crew arriving at shift change receive assignments in letter form with appropriate explanations directly in the sections and plant services. In generalized form the assignment for the crew is transmitted to it by the director.