

APPROVED FOR RELEASE: 2007/02/09: CIA-RDP82-00850R000100050014-0

7 MAY 1979

(FOUO 8/79)

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JPRS L/8443

7 May 1979

TRANSLATIONS ON EASTERN EUROPE
ECONOMIC AND INDUSTRIAL AFFAIRS
(FOUO 8/79)



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CZECHOSLOVAKIA

ESTIMATED 10,000 ROBOTS TO BE OPERATIONAL BY 1990

Prague TECHNICKY TYDENNIK in Czech 6 Feb 79 p 3

[Interview with Milos Fibiger, vice-director of the engineering and metallurgy branch of the Federal Ministry for Technical and Investment Development]

[Text] More and more frequently we encounter the word "robot." Karel Capek in his novel "RUR" once invented this word and the Japanese used the term to describe mechanical devices simulating the work of a man to honor the memory of the great writer. The specialists, however, have another definition: a robot is a device with one or two arms, at the end of which is a grabber which serves to pick up and move an object. The scientists conclude: it is an integrated system capable of goal-oriented integration with its natural surrounding according to programmed instructions.

There are other definitions but, basically, it is an instrument which replaces a man in unhealthy surroundings, will replace him during night shifts, will facilitate automation, etc. All this, of course, only if a man will give it prior instructions, create conditions for the robot's tireless activity and construct a robot which will work without a malfunction. We held a discussion with Milos Fibiger, P.E. vice-director of the engineering and metallurgy branch of the Federal Ministry for Technical and Investment Development [concerning the subject].

[Question] According to statistics, there are about 5,000 industrial robots in the world today. However, the need for robots is constantly increasing because of various economic, technical and social reasons. What are the current situation and projections for the near future concerning the use of robots in our country?

[Answer] The development and introduction of industrial robots and automated systems is most advanced in Japan. They started 10 years ago and have already produced 30,000 robots, that is a substantially higher number than indicated in statistics. It is estimated that by 1985, 20 percent of total production of robots will be robots with higher "intelligence."

The CEMA [Council of Economic Mutual Aid] countries are also making rapid progress in this area. Poland produces several types of robots and

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automated systems partly of its own construction and partly under a franchise; Bulgaria operates in a similar way. Soviet Union will produce several thousand robots during the current five-year plan and will purchase many more--from Hungary alone it will import about 200 of them this year. In our country, we have been involved in manufacture of robots and automated systems since the beginning of the seventies. In 1974 we concentrated our efforts on the state plan task of scientific and technological development and we created an advanced workshop of the scientific-technological development at the Research Institute of Metal-working Industry in Presov. At the recent exhibit, ROBOT 78, we were able to offer to our industry mass produced robots PR-16 and QIN-020 and automated systems M4, MP-1-R, MU-1-R, etc.

By 1980 our industry will have at its disposal series of numerically controlled industrial robot models of a building-bloc type with operational weight of 4, 16 and 32 kilograms [respectively], and also series of specialized automated system models for machining, forming and casting parts under pressure weighing from 4 to 63 kilograms. It is probable that, in addition to this series, a production of two other specialized robots will be started.

For the future we are considering a wider application of industrial robots and automated systems and their gradual introduction into flexible manufacturing systems of automated workshops and lines in most of the branches of our national economy. In 1990 we expect that our industry will use about 10,000 robots and more than 20,000 automated systems. However, to reach this goal, it will be necessary to complete a research-development and production basis, including planned capacity and, above all, to intensify and widen the international scientific-technological cooperation.

[Question] The industrial robot, as a kind of a technical model, is a flexibly programmable automated equipment characterized by its ability to adjust to an environment and is based in cybernetics. It is also one of the definitions which, to a large degree, involves future development. In which direction then is the development of industrial robots headed?

[Answer] There are still many opinions about the definition of industrial robots. They are devices that provide versatile, flexible movement functions that resemble the movements of upper extremities of a human being. As a rule, they are divided in five groups:

1. [Process control] robots that a man operates directly,
2. Robots with successive work steps according to a set program, condition and position; it is possible, but still difficult, to change their programming,
3. Robots taught the work process by a man who directly carries out the necessary movements which the robot then repeats automatically,

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4. Robots with numerical controls which operate on the basis of numerically coded work information and, finally,
5. Robots which can regulate their own activity through their sensing and recognition capabilities.

With the expected technological progress, other robots capable of performing bio-mechanical functions and movements as, for example, snakes or moles may be introduced. It will, therefore, be necessary to adjust the classification and definitions of industrial robots constantly according to progress and their construction.

Many countries have adopted the Japanese type industrial robot, because it points out future trends. By the beginning of the year 1980 Japanese industry will have hundreds of intelligent industrial robots in the automated assembly lines and in product controls where they will probably replace or supplement the sectional assembly line automated systems.

It is expected that intelligent robots will be used to great extent in the nuclear branch industry and in automated nuclear power plants, in welding control, etc. It is assumed that the production of intelligent robots will increase by more than 20 percent by 1980. All advanced industrial countries are conducting research in this field. In socialist countries, the Kiev Institute of Technical Cybernetics at Glusov is working on problems of artificial intelligence in industrial robots. Our Academy of Sciences and some universities are involved in solving project segments contributing to development in this field.

[Question] It is possible to say that the industrial robots and automated systems are in the forefront of interest such as the computers used to be some years ago. Practice taught us that those using them were not always properly prepared to use this technology, that often it was just a matter of novelty [which attracted them]. How do we plan to use the robots in our country so that they would not become only a subject of admiration or claims of ownership?

[Answer] There are still many development, construction and research tasks to be solved in the technological development of the industrial robots. Nevertheless, it is becoming clear that the focus of their further development and utilization lies especially in their quick and efficient introduction into the production [lines] since a robot can work continuously for 24 hours and can function for 600 hours without a need for repair. The Japanese specialists are considering up to 2500 hours of trouble-free functioning. The greatest task will be to organize the environment of an industrial robot in such a way that a continuous flow of materials in supply and transfer lines keep the machines working without interruption. Here is an open field for the activity of technical engineers and designers solving peripheral and software problems. In our state plan, we have considered this area and concentrated on it more than one-third of our capacity. We

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have several dozens of workers who selected about 200 representative model workshops and at 60 of them detailed projects are already proceeding and are ready for introduction of industrial robots.

Considering that after 1980 we will be producing several hundred robots a year, it will be necessary that every enterprise and plant, every planning organization and especially the Research Institute of Metallurgy consider necessary capacity in preparation for introducing this new technology. It is necessary to prepare the manufacturing process in the plants, in such a way that there would not be a repetition of the well-known cases from the field of other automation technology which often had to wait for months to be used and sometimes even longer before it was able to attain the expected effectiveness.

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CZECHOSLOVAKIA

CAPITAL INVESTMENT IMPLEMENTATION IMPROVEMENTS DISCUSSED

Prague POLITICKA EKONOMIE in Slovak No 12, 1979 pp 1127-1135

[Article by Jaroslav Fidrmuc: "One Alternative for Making the Indicator System in Capital Investment Implementation More Efficient"]

[Text] To carry out the strategic policy of the development of the Czechoslovak national economy—to raise to a maximum its efficiency and the quality of all work—one of the critical requirements is to improve the efficiency of the plan indicator system itself. Increasing the effectiveness of the complex of rating and statistical-recording indicators, defining and specifying their functions and also their interrelationships are dependent to a considerable extent on the socioeconomic developments governed by them—the efficiency and quality of work performed as well as the economic balance. It is particularly valid that whatever forms the basis for evaluating and stimulating workers' collectives in the national economy will also be the basis for orienting their economic activity.

In the directive for economic and social development in the CSSR for 1976-1980, adopted at the 15th CPCZ Congress, it was emphasized as an important task: "To perfect the indicator system for operational and five-year national economic plans and their mutual organizational, branch and regional interconnections in order to more effectively direct the activities of ministries, economic production units [VHJs], enterprises and national committees for the efficient development of the reproduction process."¹

It is especially urgent to improve the indicator system of the capital investment process. This is because the investment process is the cornerstone of the dynamic of the entire national economic plan owing to complexity of the relations among participants--between investors, industrial designers, suppliers and sub-suppliers and also among future users of projects under construction where every development aberration governed by the indicators is very difficult to correct by intervening in the management system, particularly since the investment process is largely an individual one, repeating itself only under differing local, technological and supply² conditions.

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Moreover, increasing the effectiveness of the indicator system is particularly urgent in the area of decision-making as well as in the area of preparation and also in the area of capital investment implementation. This is evidenced by shortcomings which have developed in all three of these areas of the capital investment process. The rapidly growing availability of modern computer technology and the advanced state of discussions about the indicator system in the management of capital investment, however, likewise demonstrate that objective and subjective conditions are ripe for substantial changes in the whole indicator system.

To be sure, it is not possible to eliminate existing shortcomings in the management, planning and implementation of capital investments simply by means of changing and increasing indicators' effectiveness. Solving the problems of capital investments depends on improving the system of planning management as a whole, particularly on overall improvement and increased effectiveness of the planning system which at present must be directed primarily toward efficiency and quality. Not the "indicator" aspect but the management aspect as a whole must also be decisive in evaluating this one alternative (difficult enough of attainment) to make the indicator system of capital investment implementation more efficient.

1. On the Problem of the Range of Indicators

First of all there should not be too many indicators for the implementation of capital investments. Too many indicators only spawns inadequate dovetailing and mutual contradictions which in turn make it extremely difficult to utilize modern technology which calls for optimum economic development at individual segments of management insofar as possible under a single and distinct indicator. To try to encompass and regulate as far as possible all aspects and sectors of operations of supply organizations under a great number of development indicators weakens their primary orientation toward key roles.

At the same time, however, the need to regulate more and more aspects of suppliers' operations gradually raises the necessity of finding new indicators. In the interests of optimum conditions for building-starts it is proposed to establish an indicator on the volume of building-starts; in the interests of innovation it appears desirable not only for industrial suppliers but also for suppliers of structural parts to find and evaluate an indicator covering the amount of new products; in the interests of implementing the results of science and technology a special indicator on implementation of the planned role of science and technology is needed; and finally, it is necessary to definitely prepare a specially designed plan on improving quality, with products divided according to degrees of quality. Indicators on the implementation of capital investments were added the same way in past years, especially in the sector of specifying the structure of volume implementation and in the present state of relations between management of local enterprises, and on higher echelons none of these can be simply designated as superfluous or anachronistic.

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The solution offers--in addition to strengthening central planning management and thus also the importance of key indicators--strengthening of the authority and responsibility of lower echelons of management. It is precisely in the under-rating of this other aspect of Lenin's principle of democratic centralism where the deepest roots of current shortcomings lie, which--being unresolved--must be counterbalanced by increasing the number of specific indicators. On the other hand, increasing the authority and responsibility of VhJs, enterprises and national committees would make it possible to link individual indicators such as indicators on the volume of output and indicators of quality--in fact, it is not hard to imagine even optimalization of the area of state planning and accounting into a single indicator.

Such a single indicator (taking an extreme solution) could be the amount of penalty or, conversely, the bonus for timely, quality and economical fulfillment of economic agreements. By balancing the plan of capital investment operations and the obligation of contracting economic agreements, this indicator could also express comprehensively the fulfillment of planned tasks by suppliers.

Especially in the sector of capital investment, however optimalization of development toward such a single indicator for the work of suppliers would require a number of restrictions: obligatory fulfillment of volume quotas on specific and centrally reviewed constructions, the role of export of investment works and deliveries, the role of construction in particularly important sectors, such as civil defense, environmental protection, etc. Assuming not too high a proportion of these especially binding investment works and deliveries (not a preponderant share), however, these restrictions would in no way invalidate the optimum application of this one indicator--with the existence of others having only a statistical-recording function.

This kind of change in the indicator system would unquestionably require a great deal of political-organizational work, if only to get the ministries, VhJs, enterprises and national committees to shift their main attention from volume indicators to key indicators of efficiency and quality which could even include penalties or bonuses. This kind of shift of the main attention would, however, fully conform to the strategic line of the 15th CPCZ Congress.

For the time being, checks of management and approaches to meeting economic goals at individual levels of management show that generally in the production sphere major attention continues to focus on planned volume indicators and their fulfillment³, contrary to the policy of the 15th congress. But as long as supply organizations are judged largely according to volume indicators, and personal job income is based on their fulfillment to a wholly preponderant degree, then it is unrealistic to expect any substantial change in procedures.

A change in the subjective attitude toward fulfillment of tasks is thus conditioned on a change in indicators, and a change in actual functioning

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of the indicator system in turn calls for exceptional efforts to change the very thinking of economic workers (how much political-organizational work would be required just to create the conditions for real enforcement of penalties). This effort to make the indicator system more efficient would, however, bring about an incomparably greater savings in the amount of work now performed in insuring fulfillment of volume indicators even contrary to societywide interests primarily regarding efficiency and quality.

Moreover, some experience in utilizing modified (reduced, rationalized) forms of profits as the decisive qualitative indicator of economic development--and penalties or bonuses for timely, quality and economical fulfillment of economic agreements are nothing but that--has already taken place in the socialist countries, notably in the Hungarian People's Republic, which may provide a point of departure.

The significance of increasing the role of the penalty as a qualitative indicator has also for some time not escaped the attention of Soviet theory, which in particular began to analyze what amount of penalty would be economically justifiable and the form of its effect. A new and very important incentive for these considerations came up in the discussions at the 25th CPSU Congress and its deliberations. The proposal to change the current practice of economic management which allowed general recovery of any penalty from enterprise profits to one in which the enterprise bonus fund would be charged and the responsible workers, in addition to sharing the discipline, would also bear a very specific personal material responsibility, met with an unusually lively response and unanimous support, and this important objective to improve management of the national economy was also incorporated into the documents of the 25th congress.

In implementing capital investments which depend entirely on rapidly changing supply and demand relations and a selected variety of investment media supplied by many sub-suppliers, the substantially increased role of the penalty would have all the greater impact.

2. Discussion on Replacing Gross Production Indicators with Net Production Indicators and Capital Investment Implementation

At present, under the burden of prevailing attention directed to the volume indicators, it is sometimes considered as simply a tragic misunderstanding that the volume of gross production ever at all became the chief rating indicator for enterprise operations. It has been shown objectively that it could always perform only a statistical-recording function.

In this regard one tends to forget, however, that in the economies of the various socialist countries, including Czechoslovakia, throughout the recent period of intensive industrialization processes, there was a whole long period when the quantity of production was really critical, even at the cost of higher cooperation, which in the long run also had a progressive impact. Perhaps no sector of national economic development can better document this fact than precisely the sector of capital investment implementation.

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During this period of extensive development it was also necessary to use any material that was available, even if it cost more than originally budgeted. Moreover, with minimal interest on the part of enterprises in profits and with strict central management of the economy there was also in this period little risk that the enterprises might have preferred using more expensive materials to achieve a higher gross volume of production.

Rating the enterprises largely on the basis of fulfillment of gross production, and later according to gross output achieved, was rightly a reflection of precisely this period.

After overcoming this period, however, the sector of capital investment implementation still perhaps most clearly evidences the anachronism of persisting in this rating indicator. In the interests of better ratings on the basis of higher gross value of construction, even industrial designers of projects would rather use more expensive materials and materially more demanding construction with enthusiastic cooperation which, given the individual character of construction is, on the one hand, particularly easy to do and, on the other hand, particularly hard to detect. This interest in the highest possible gross value of their construction is even increasing among the contractors of capital investment projects and supplies, and they also are replacing original project materials with more expensive ones and obtaining increasing cooperation. The investor is not only unable to counter these antisocial endeavors with sufficiently effective means but he even lacks any material incentive to oppose them.

To be sure, ever since 1975 a transition to indicators of net production is being experimentally checked in 14 enterprises in the CSSR. These are in three forms: on the basis of net production of goods, net output and reduced output. Then, generally according to a specified methodology since 1976, the output indicators are cleared, for purposes of drawing wage costs, of the amount corresponding to unplanned changes in the proportion of material costs (including cooperation) which also is important in the implementation of capital investments.

This specified methodology, however, does not, on the one hand, influence the actual stage of drawing up the plan for material costs of construction which is, after all, only to insure material economy in a key stage--even if unplanned changes in the proportion of material costs of construction, including cooperation, are deducted. On the other hand the enterprises retain a higher profit as a result of the higher cost of construction owing to more materially demanding production, as well as certain other advantages issuing from surpassing the plan of production because of higher material costs. A qualitative change in the interestedness of enterprises in economy has not yet come about, and discussions on a change to a more realistic indicator of the actual merits of an enterprise are proceeding apace.

They are proceeding in general even though enough arguments⁴ have been collected favoring indicators of net production versus indicators of gross production.

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But even in advance it is apparent that this indicator: 1) will more or less (depending on the individual form) not stimulate the enterprises to prefer materially more demanding production nor of itself will it, more or less, inspire them to material savings; 2) will give enterprises all the greater interest in increasing the amount of manual labor or (more precisely) norms of amounts of reported wages, also contrary to principles of economy.

Since the discussions on shifting to indicators of net production have a distinct international character, it is all the more necessary to mention the Czechoslovak experience for which Czechoslovakia paid dearly not so long ago:

Certain theoretical proposals today are tending toward indicators of net production determined by deducting taxes from production funds, interest on credit, pension, fixed and certain other payments, so that in essence they would be limited only to the volume of wages plus net profit. This kind of indicator, however, is too closely reminiscent of the enterprise interestedness in gross revenues which the Sik group tried to introduce in Czechoslovak economic reforms during the second half of the sixties. The results of the shift to enterprise interestedness in gross revenues were at the time among the most serious in the revisionist slide of economic reforms in Czechoslovakia because the management of manual labor was completely turned around, and interestedness in the amount of gross revenues of enterprises led to overpayment of labor which brought about reduced purchasing power. A return to the concept of enterprise interestedness in profit thus, at that time, naturally had to be one of the first measures in the sector of management of the economy upon formation of the new party leadership headed by Comrade Husak.

Particularly in the sector of capital investment implementation the shift to a rating indicator of net production also conceals a great risk associated with the danger of greater disparity in the earning capacity of various investment operations and deliveries. Experience up to now with differing profitability, for example in the construction of apartments on the one hand, and civic or technical construction on the other, showed what a sensitive problem it is. Even after adjustment of wholesale prices as of 1 January 1977, there is no guarantee in the present price structure against such a risk with sufficient economic justification.

All this shows that the present method of rating enterprise operations not only cannot be regarded as adequate but that even current discussions on replacing indicators of gross production with indicators of net production are far from assuring a final satisfactory resolution. The shortcomings of indicators of net production in whatever form, depending essentially on gross enterprise revenue, rather argue for further refinement of indicators of enterprise merits so as to limit them to enterprise profit or its particular form--penalty or bonus for timely, economical and quality fulfillment of the enterprise responsibility toward society and its economic partner.

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3. The Indicator System of Capital Investment Implementation and Relations of Supply and Demand

One of the most important tasks of the indicator system of enterprise operations, indeed, viewed from the objective of insuring national economic development, the most important one of all, is to stimulate enterprises to contract and fulfill supply and demand obligations and thereby satisfy society's needs. But it is precisely here that national economic problems are literally piling up.

Neither the earlier change from indicators of gross production to indicators based on output achieved, nor the clearing of this indicator since 1976 for purposes of drawing wage costs in the amount corresponding to unplanned changes in the proportion of material costs (including cooperation) succeeded in solving, nor could they solve, the main problem based on the fact that a considerable number of enterprises are oriented only toward meeting gross values of production and therefore do not meet several indicators. But because the tasks placed on enterprises are more and more taxing, the result is a worsening of supply and demand relations, particularly noticeable in capital investments implementation.

Thus the acuteness of the problem called for, and still calls for, further measures. As of 1977 there was a modification of rating indicators for leading economic workers so that specific fulfillment of critical tasks in the structure of production became of prime importance to them.

In the prescribed rating indicators, which should number no more than five, special emphasis is placed on fulfilling mandatory tasks in the plan of capital construction, tasks concerning building projects which must be completed according to central determination, and tasks according to supplier contracts on the territory of the capital city of the CSSR, Prague, the North Bohemian Kraj National Committee and the capital city of the SSR, Bratislava.

The problem, however, is that—as shown by current analysis—the enterprises are still essentially oriented toward fulfilling tasks of growing production volume because from the indicators of quantitative development—output achieved—there is deducted within the framework of the whole national economy about 96 percent in wage funds. Remaining only on the periphery of suppliers' interests—and again this applies especially to capital construction—is fulfillment of the requested full assortment of products, to say nothing of the remainder of material tasks, fulfillment of the system of selected indicators of economic efficiency (it is characteristic that in preparing the Sixth Five-Year Plan they served only as information on quality of the draft plans submitted but are not of a binding nature), and also indicators of quality of production. Furthermore, even fulfillment of these indicators, insofar as they are achieved, again are essentially achieved by fulfilling or surpassing only the volume indicators themselves.

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This situation naturally turns attention toward substantially increasing the role of economic instruments. It is not by chance that in the forefront of this attention are sanctions for nonfulfillment of supply and demand commitments, again particularly in capital construction. The penalties exacted for nonfulfillment of supply and demand obligations are not fulfilling their function essentially within the framework of the whole national economy.

An inquiry carried out at the beginning of 1977 by the SSR Ministry of Development and Technology among workers of 120 enterprises and VHJs, chiefly of industry and building trades in Slovakia, on reasons for the shortcomings in capital construction did indeed at first glance bring out indications that the penalties are at least partially fulfilling this role: According to the replies, 21 percent of the VHJs and 34 percent of the enterprises exacted penalties, but according to this inquiry in 12 percent of the VHJs and 29 percent of the enterprises penalties for the most part were not exacted because the effort exerted was not sufficiently effective; 38 percent of the VHJs and 51 percent of the enterprises even openly admitted that in most cases they did not exact them in order not to disturb their relations with their suppliers.

Typical of this view was the case of a worker in an investment body who consistently exacted sanctions through arbitration for nonfulfillment of contractual obligations and was finally forced to leave the enterprise because the supply organization was no longer willing to cooperate with him.

One can state that in the present chainlike state of nonfulfillment of supply and demand obligations it is difficult to definitely blame the supplier; even the amount of the penalty is not of interest to the consumer (investor) for its economic impact and, moreover, the consumer (investor), considering the preponderance of demand over supply, is not on an equal footing with the supplier.

Society's conviction is definitely growing that penalties should fill their important role as sanctions for failure to meet supply and demand obligations and society also ought to use the full weight of its authority to insure this role.⁵ But the development of society's views goes even further. Many prominent figures of society are today also seriously thinking about the question of why sanctions are not being applied, not only against the enterprises but also personally against their responsible workers, not only for nonfulfillment of supply and demand obligations but also for nonfulfillment of tasks of technical development, tasks of raising the quality of products and, naturally, of reducing costs.⁶ Here there are clear indications of efforts to extend penalties to sanctions for failing to fulfill economic tasks in general with an effective impact on the compensation of responsible workers, which, after all, fully corresponds to the demanding requirements of the present stage of development.

Primarily, however, there still remains the problem of reinforcing the real purpose of the penalty as a sanction for failure to fulfill supply and

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demand obligations and its opposite form--bonuses for timely, economical and quality fulfillment of economic agreements.

Penalties, for instance, ought to be an effective aid in solving such an important problem for suppliers as that of disadvantageous production. "What kind of production is that? Perhaps it's not even needed at all?" ask Soviet authors M. Lobacov and V. Jefimov in the article "Planning Indicators in the Mechanism of Management" published in the periodical KOMMUNIST, and they themselves reply: "No, it is needed by the consumer, the national economy, but it is disadvantageous to the producer because this kind of production, as economic workers sometimes say, won't get you far; it won't fulfill the plan nor will you get a bonus. So the manufacturer produces mostly the products that insure him fulfillment and overfulfillment of the plan's 'implementation' in rubles and tons, and often the consumer has to take what does not suit him much. Therefore many enterprises are shaking: the job of supplying on demand (note, not in production) efficient kinds of finishing goods, certain rolled sections, pipes and other materials is becoming more and more complicated."⁷

It seems that this problem can be easily solved by a simple means: a change in the manner of rating the work of enterprises according to the value of production, taking into account the fulfillment of production plans of varied goods consistent with contractual obligations, and orders. As stated by the same Soviet authors "...in each case, just as soon as the introduction of this kind of method was brought up, certain industrial ministries actively objected to this procedure for various reasons. The system of impersonal fulfillment of the plan in its overall value is so entrenched that even a qualified formulation of the question of responsibility for nonfulfillment of planned deliveries appears unbelievable to some economic leaders."⁸

They are also having very similar experiences in the CSSR in the current practice of changing indicators of the delivery structure into rating indicators, even though only in the most important national economic tasks.

The opposition of leading economic workers to rating enterprise operations according to their fulfillment of varieties of deliveries is, however, understandable to a certain extent. If it were not possible to make up for nonfulfillment of deliveries of one kind of product by exceeding the planned volume through production of other kinds of goods, the enterprise would seldom be able to report fulfillment of the plan, often because of missing subdeliveries from other producers. Theoretically, then, it would even suffice for just one product out of thousands to be lacking in the planned quota in order for the enterprise to fail to meet its plan and not receive any bonus. In the national economy, however, the shortage of this single item, albeit of negligible value, could actually prevent the finalization of extensive production units, which is typical precisely in capital construction.

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In capital construction, however, the shortage of just a single minor material or component part which the supplier regards as "disadvantageous" production is one of the main factors contributing to the proliferation of building-starts and extended building deadlines and against which--as is shown by experience--the most authoritative orders have little effect. (Another important factor, which again is also rooted in the system of rating indicators, is the fact that the building and assembly organizations themselves, in their frantic quest to meet volume indicators, keep increasing the range of building-starts and thus prolong construction periods.)

In those cases, though, where even the most authoritative orders are of little avail, a substantial increase in the role of the penalty could be of significant help. In Soviet theory and specifically in the article by the authors quoted, even the basic principles of establishing amounts of penalties and assigning responsibility for them are crystalizing, as well as forms of levying them:

1. The amount of the penalty should compensate the consumer (investor) for damages sustained, not according to the value of the nondelivered product but based on the amount of benefits lost.
2. The association to which the enterprise belongs should be responsible for the penalty, which, in the Czechoslovak system of management, is the V.H.J. Unquestionably, this would considerably raise the role of the middle echelon of management in the system of supply and demand obligations without any further resolutions.
3. The sums should be levied on suppliers by means of arbitration without litigation and at the suggestion of the arbitration office itself, not at the behest of the party which suffered the loss.
4. The source of payment for the penalty must not be the state budget nor production expenses but the enterprise's or V.H.J.'s own funds, with the responsible workers being personally penalized.

This method of replacing partial responsibility with a system of full responsibility of the supplier vis-a-vis the consumer (investor) at once closely reflects Czechoslovak conditions as well as the developed needs of the Czechoslovak economy, perhaps with one pointed difference: clearly, in no other Socialist state is there such a pressing problem as the fact that the enterprises refuse to make economic agreements at all and thus take on supply and demand obligations. This shows, on the one hand, a lack of discipline in the national economy and, on the other hand, an imbalance in resources and in affordable requirements of known needs, specifically an investment imbalance.

4. Which New Indicators?

The indicator system of capital investment implementation can be limited and at the same time enhance its effectiveness. The key question here is

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the critical rating indicators on whose character and effectiveness depend a number of other indicators, both mandatory and informative with a statistical-recording function. The effort to limit the number of indicators, to make the whole system more flexible and responsive, however, does not exclude but rather directly also calls for new and specific indicators, with a new role on a higher level of productivity, economic relations and the social superstructure.

One such new rating indicator--as is shown by current developments of economic theory--could be the penalty indicator or one of bonuses for timely, quality and economical fulfillment of enterprise and V&H obligations to society as a specific regulated form of profit which would reflect the level of the most diverse aspects of enterprise operations. The task of innovation in the indicator system is, naturally, far from exhausted by this.

The area which apparently will require finding new indicators in the very near future and including them promptly among critical rating indicators is the plan to increase the quality of rated products. Generally up to now the indicators of this plan are not mandatory and therefore not even included among the rating indicators. In spite of this, its formulation is viewed in more than one enterprise and V&H with confusion and reservations because the entire thinking of economic workers for 10 years centered on a system of indicators directed only on fulfillment of volume indicators. The task of raising quality is one of really prime importance, especially in capital construction where they create utility values of particularly longterm use, critical for living standards. (It is not by chance, for example, that the basis of social policy today is characterized as housing policy.)

It will not be possible to change the attitude of economic workers on product quality without including the role of improved quality among the decisive rating indicators. (This, however, means that it is necessary to increase the number of mandatory indicators by an indicator of quality.)

Several advantageous avenues are offered here. Particularly noteworthy is the proposal of the Soviet aircraft builder Antonov, based on current methodology of rating indicators, to include the production of lower-grade quality only partially in the plan fulfillment. There need be only a few degrees of quality. It is characteristic that in some industrial sectors at present the number of quality grades has been reduced from the former three grades and job lots to only two grades and product groups which do not meet norms. Under present conditions of increasing demand for quality, this kind of development is normal. Also characteristic, however, is that in these same production sectors the discounts for second-grade goods are currently an average of 10 percent higher.

Unquestionably, if specific implementation of investment construction resulted in, say, 100 percent fulfillment of the plan but products of second

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rate quality were counted in the converted plan fulfillment by a lower coefficient of only a few percent, then by the present method of rating indicators this would have considerable influence on substantially increasing attention to quality. But one could go even further: unmet planned indicators of quality counting as only partial fulfillment of volume quotas could be subject to sanctions of a corresponding penalty and thus transform product quality indicators without any other mandatory indicators into this single rating indicator.

Similarly, it would be possible to deduct from plan fulfillment (at least partially) unmet volumes of new products even if their production were replaced by noninnovative products; it is even possible to consider deducting from plan fulfillment the production of goods that are poor technically or out of date.

A special chapter of regulation by the indicator system is "Problems of Building Starts." Not that this area is not sufficiently the center of attention. A part of the plan of reproduction of fixed assets is also in a separate form, "Data (summary) on Buildings Brought into Construction," with divisions on mandatory construction, centrally reviewed construction and other construction, with building-starts under these divisions in the various years of the five-year plan. All central organs (including kraj national committees--without comprehensive housing construction) are working up this formula for structures budgeted over Kcs 2 million and the high social interest in reducing building-starts by scheduling tasks is spreading to the enterprises. In spite of this, goals for reducing building starts are far from being met.

In seeking the reason for this state of affairs the economists are very skeptical of the view that excessive building-starts can be dealt with by increasing the interestedness of managers or other leading workers of supply organizations in meeting their assigned tasks. They rightly see the root of the problem rather in the methodology of the plan, specifically in the fact that investors are assigned investment limits and they, under pressure of various interests (every construction job has its own patron), in turn urge suppliers to begin more and more jobs--even though they may not have available capacity for them, so as not to lose these limits--all of which only helps to further increase the range of building-starts, or at least is a serious hindrance in eliminating excessive building-starts. That is why the economists showed great interest in the proposal of the director of the Institute of Economy and Organization in Construction in Bratislava, Engr J. Longauer, in establishing an indicator for optimum building-starts in building organizations which would help to shift the planning and management of building-starts to suppliers according to their real capacities. It may be added that the question of introducing an indicator for building-starts is worthy of consideration also for suppliers of technological building parts, especially for assembly organizations.

The problems of establishing new indicators in managing the implementation of capital construction with all its complexity are, naturally, much broader and many-faceted.

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As production forces, production relations and the social superstructure are developing more and more rapidly it is also necessary to adjust the indicator system more and more often to the rapidly changing objective and subjective conditions. In conclusion, it is, however, necessary to emphasize this: basic deficiencies in managing investment construction are not due to any specifics or peculiarities as compared with other sectors of management of the national economy. Specifically, in the indicator system there are general problems which only appear especially distinct and sensitive in the sector of management of investment construction. But it is also possible, therefore, to seek most effectively in this sector for the key to at least gradual alleviation and solution.

FOOTNOTES

1. 15th CPCZ Congress, Bratislava, Pravda Publishing House 1977, p 546.
2. Recently discussions are reviving with great practical import on whether capital construction is a production or supply process. Any kind of narrowed concept of the investment process, however, dangerously narrows the field for seeking the roots of the shortcomings in capital construction. As I already emphasized in my study, "Some Basic Problems of Analysis of Relations Between Investment and Balanced Development," published in EKONOMICKY CASOPIS July 1973 (pp640-641), construction as a production process of building and assembly organizations creates only the construction basis of capital construction which, to be sure, has a specific place in the process of capital construction itself. Then on its basis the investment process proceeds as a supply process which has its own methods, organization and management of supply relations.
3. The same conclusion was reached at the meeting of the Central Control and Review Commission of the CPCZ Central Committee, 16 May 1977.
4. Here specifically in articles by Engr J. Dvorak, Dr Sc (POLITICKA EKONOMIE November 1974, January 1976 and April 1977); in the USSR in an article by the director of the Economics Institute of the USSR Academy of Sciences, Prof E. Kapustin, concluding an extensive discussion on indicators of labor productivity (VOPROSY EKONOMIKY, February 1977).
5. In this connection it may be stated as characteristic in the Soviet Union, where nonfulfillment of the role of the penalty is more or less the same, that it was even proposed that responsibility for fulfillment of contractual obligations be included directly in the new draft constitution.
6. "I know of no instance in my experience where a responsible economic worker's bonus or remuneration was reduced because he allowed the

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production of goods technically, functionally or esthetically deficient"
(Deputy J. Mevald at the meeting of the CSSR Federal Assembly, quoted
from the article, "Current Budget Policy," PRAVDA, 1 July 1977, p 2).

7. Quoted in article in KOMMUNIST No 16, 1975 (Domestic translation VUNH VSE
in Bratislava, pp 4-5).
8. Ibid pp 7-8.

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