

The Robinson Report (May 1950)

Caption: Entrusted to an American engineering consultancy firm by the Economic Cooperation Administration (ECA), a body responsible for monitoring the use made of Marshall aid in Europe, the Robinson Report, published in May 1950, strongly criticises the management of the Belgian coal mines and advocates their modernisation.

Source: ROBINSON, Niel. Report on the Belgian Coal Industry. Economic Cooperation Administration-Special Mission to Belgium & Luxembourg (Ed.). Brussels: 1951. 27 p.

Copyright: (c) Economic Cooperation Administration-Special Mission to Belgium & Luxembourg

URL: http://www.cvce.eu/obj/the_robinson_report_may_1950-en-17a5fe07-2004-41a5-8447-95b320396da6.html

Publication date: 20/10/2012

The Robinson Report (May 1950)

General Observations on Current Problems

There exists today a grave crisis in the Belgian coal industry and, in turn, in the over-all economy of the country. In spite of the fact that pithead prices average over \$14.00 per ton, the industry, as a whole, is currently losing money. The cost of producing coal is in certain cases up to 70 percent higher than in neighboring countries. Coal, today, constitutes over 50 percent of the total finished cost of making cement and electric power, and to a varying degree, power and coal enter into the finished cost of all manufactured products. This means that the cost of manufacturing steel, chemicals, gas and virtually all manufactured products is unduly high, affecting not only the cost of living in Belgium, but also the Belgian competitive position with reference to exports of all such products.

There are basic underlying reasons for this situation, some occasioned by natural conditions and some, man-made conditions. The coal mines in Belgium are the deepest in Europe, as deep as 5,100 feet, and most of the coal seams are the thinnest in Europe. Large amounts of explosive gases are encountered.

Offsetting this, the quality of the coal is, on the average, the best in Europe and the most diversified, ranging from semi-anthracite to very high volatile coal.

Before the last war, Belgium was a country having a low cost of living and wages were normally 30 to 50 percent below those in neighboring countries. On the other hand, Belgian coal costs an average of 30 percent more than coal in the other European coal-producing countries. This difference was small enough to maintain sufficient protection for its national production for the Belgian coal industry owing to its geographical position vis-à-vis its neighbors.

In spite of a higher price of coal, the coal-consuming industries still succeeded in keeping their place on foreign markets, thanks to the lower wage rate prevailing in their factories. That is perhaps why certain mines did not make very great efforts at modernization during that period.

During the war, Belgium experienced a most severe enemy occupation for five long years and the coal mines refrained from any modernization which might have aided the enemy's war effort.

Furthermore, as a consequence of the price system and the increasing rise in the cost of materials, most of the coal companies found their treasuries completely empty at the end of this period.

This situation worsened after the war, because the Government, in an all-out effort to increase the production of coal as rapidly as possible, caused the coal operators to increase wages and social benefits to the point where the Belgian coal wage scale is today the highest of any industry in Europe. Tens of thousands of DP's, Italians, and prisoners of war were brought into the coal mines, most of whom were unskilled and had never worked in the mines.

The Government, in order to hold down inflation, instituted controlled prices and a subsidy plan which was combined with a compulsory industry profit-sharing plan. The latter provided that mines making money had to turn over a substantial portion of their profits to companies losing money.

It is understood, therefore, that under such circumstances certain coal companies found it impossible since the war to make any investment for modernization and finally, in 1950, found themselves up to ten years behind in development work in modernization as compared with the progress attained in the mines of some of the allied countries during and after the war.

The Government finally realized that a mistake had been made, and as a consequence, is removing all subsidies gradually, until early in 1951, when they will be stopped.

In spite of very high realizations, a large number of companies are faced with intolerable losses, as high as

\$4.34 per ton, with the removal of subsidies.

Specific Observations concerning Belgian Coal Mines

This report has been based on the following: The coal operators were requested to prepare on a schedule submitted to them, an analysis of their current operating statistics, a profit and loss statement, and contemplated capital expenditures. Companies producing 88 percent of the coal in Belgium answered this questionnaire. Visits were made to 48 mining concessions out of the 63 currently operating in Belgium, as well as 23 underground inspections. Mines in all five districts of Belgium were examined.

It is our considered judgment that whereas the average cost of production today is \$14 per ton, we believe in great part it should be able to be reduced to \$11 per ton and quite possibly some cases may be obtained where the cost of production could be reduced to \$9 per ton. However, it is thought that in order to accomplish this, it will be needed to seek financial aid (in some cases) to provide the funds necessary for a modernization and mechanization plan and would, of course, require a few years to be accomplished. This report will propose no basic changes in the present method of mining in Belgium and will make no recommendations, with few exceptions, unless the proposed method is already in use in at least one Belgian mine.

Basically, what is proposed is to adopt at all of the mines, in all phases of the operation, improved methods already developed in some other mines operating in Belgium.

As a means of informing ourselves of the general condition of the industry, as well as to obtain technical information with regard to the methods in use, conferences were held with members of the industry and the Government.

Conferences have been held with the labor leaders. The extreme gravity of the coal situation was pointed out to them. Unless fundamental changes are made in the coal industry, many mines will be forced to close for economic reasons unless very heavy subsidies are paid by the Government permanently. The Government states flatly that this will not be done. Furthermore, it was pointed out that unless the cost of coal is reduced, exportation will become increasingly difficult and other industries such as cement, steel, chemicals, etc., will be forced to curtail production and thus throw additional thousands out of work.

If, on the other hand, the Belgian coal industry is made an efficient and relatively low cost producer, the export of goods will be facilitated, resulting in increased business activity, which then would permit the gradual absorption of the miners who are displaced. Basically, we understand that the labor unions and the Government have agreed that this must be their policy and they have stated that, provided the full cooperation of management is obtained, they are reconciled to a gradual reduction in the present labor force at the coal mines.

There is another factor which should facilitate this reduction and that is that the labor turnover in Belgian mines is unusually high. At some places, the turnover underground is up to 100 percent annually and on the surface 30 to 40 percent. Thus, when a modernization program is instituted in one certain phase, then during the transition period, as men quit their jobs new men would not be hired to replace them. In this way, in a majority of cases, it would not be necessary to discharge miners.

It is to be noted, however, that the relatively high value of Belgian wages and coal prices result partly from the fact that the Belgian Government resisted more than did some other Governments the solution of devaluing the currency and maintaining an artificially low cost of living at the expense of the standard of living of the workers. Thus, the last devaluation, in September 1949, which was only 12.5 percent in Belgium instead of up to 30 percent as in the neighboring countries, increased the difference in coal prices by about 125 francs a ton. That is approximately one-half of the difference existing between the average Belgian domestic price and the average price of German coal delivered in Belgium.

1. Study of a mine.

As a result of a conference, held with leading Belgian coal operators, a highcost mine which is currently losing \$2.72 per ton was taken as an example of what could be accomplished. A complete breakdown of the present labor budget and a proposed labor budget were prepared. These breakdowns will be found in the Appendix. Item by item, the two budgets were compared and were discussed in great detail. The estimated capital expenditures required to do this work were then gone over. At the conclusion, it was generally agreed that the proposed budget and the proposed production could be attained, given the original assumptions on availability of coal and geological conditions that would permit of the operations suggested. The only reservation was that this proposed plan might involve an over-concentration of working places. In the event this was found to be the case, there were sufficient men shown on the proposed budget to take care of this.

The engineers present pointed out, however, that in the general plan of concentration of the coal fields, studied by the experts on this basis, this mine was to be joined to a neighboring concession and that, with a view to avoiding useless expense, it had been decided to stop operation, as the reserves could be mined economically from a neighboring pit. Since this was written, this particular mine has been joined to the neighboring concession for mining.

If this proposed plan were to be put into effect with results as anticipated, this mine would change from a mine losing \$2.72 per ton to one making \$1.86 per ton and would advance from one of the highest cost mines to the lowest in Belgium. Based on present coal sale price levels, the cost of putting this program into effect can be entirely repaid in 14 months.

In order to demonstrate how such a surprising showing can be made, the following suggestions for savings are presented:

Thirty-seven mine car pushers, twenty-three horse drivers and sixteen men operating the main line rope haulage, or a total of 76 men can be replaced by eight men operating Diesel locomotives.

Forty-nine men are used to cage mine cars. By concentration and utilization of modern equipment, this can be cut to six men. One hundred and twenty-three men are used to back-pack the coal faces and to drive galleries. With only moderate, but not full, mechanization, this can be cut to 70 men. Fifty-six supervisors are currently employed. Without going to American standards, but using better Belgian standards, this can be cut to forty-one.

On the surface, coal is raised from two pits and is brought from one pit to the other. The track is broken and cars are skidded on steel plates a distance of 30 feet and are then put back on the track and their travel from the mine to the washery is resumed. Forty-three men are now engaged in caging cars and transporting them to the washery. This can easily be done by six men if coal is hoisted from one pit only and the track is made continuous, which can be done at moderate expense.

Ten men are used to unload railroad cars by hand for stockpiling. When reloading by hand, 20 men are used. The use of a second-hand clam shell would permit the elimination of 26 men.

Other improvements should be made which would permit a production of 1,000 tons per day with 791 men, or 1.26 tons per man day as compared to a present production of 672 tons with 1,116 employees, or 0.60 tons per man day. This would mean a total reduction in cost of \$4.50 per ton, or a saving of \$1,250,000 annually.

This particular mine is 171 years old. It is proposed to modernize it, but of course, there are many inevitable high cost factors inherent in a property of this age. If a newer operation had been chosen, then total cost of production could certainly have been reduced much below that estimated for the above mine and would still compare even more favorably with the next lowest cost mine, which is 13 years old.

2. Comments on improving efficiency and lowering costs.

Until now, the Belgian coal operators have been positive that there could be only a limited reduction in operating costs. They have, accordingly, turned to ways to increase their revenues as their only salvation. This has resulted in surface plants, gigantic in size, with complete facilities for making briquettes, coke, electric power for outside sale, cement block plants, manufacturing shops, and complete railroad systems.

The result of these heavy capital expenditures for operations entirely beyond the scope of mining coal has been serious inefficiencies coupled with heavy carrying charges. This has, thus, further increased operating costs.

3. Machine shops.

The mines in Belgium, as a group, have very large machine shops. These shops are equipped with expensive machine tools. The shops are equipped to make, and do make, a large part of the machinery used in and around the mine. Several hundred men are employed in one single central shop visited. At every central shop visited, inefficiency was observed.

There were always a number of men standing around doing nothing. The shops themselves were not laid out for production line methods and, as a consequence, an excessive amount of time was required for moving machinery from one place to another as it was being fabricated.

It is considered that there is absolutely no economic justification for these very large shops. If only the men required for the actual maintenance and overhauling of the equipment were employed in the shops, then roughly 90 percent of the men working in the shops could be eliminated. It would then be necessary for the coal companies to arrange with manufacturers to supply them with the material needed, or in the event there was special machinery which the manufacturers were not willing to produce, small central shops for each of the five districts could be set up to supply these special needs.

It is difficult to estimate the over-all savings, but it is anticipated that they would run into many millions of dollars annually. Assuming no improvement in efficiency, then the savings in social benefits alone, which would result from moving the central shops away from the mines, would be over \$1,000,000 annually. This is because, by law, miners receive much higher social benefits than other workers.

It can thus be readily seen that many, many millions of dollars, both on capital expenditures and operating costs, can be saved on the surface by the application of sound, indisputable business principles.

4. Employee distribution.

The unanimous opinion of everyone with whom we talked was that because of the depth of the coal and thinness of the seams, excessive underground costs were inevitable.

Actually—and an appreciation of this factor is of vital importance in understanding the problem and its solution—13 percent of the total mine employees are required to dig the coal and load it into conveyors. The conveyor discharges the coal either into other conveyors or mine cars, operating on the level. It is then transported through level rock tunnels to the shaft bottom, where it is raised to the surface in cages by large hoists, and is then processed. The point is re-emphasized, 13 percent of the employees are engaged in actual digging of the coal, and from this point on every other process is as in other coal mines all over the world.

Admittedly, because of the depth, these processes will be, in some cases, more expensive, but only in a matter of degree. The problems faced in reducing the amount of labor of 87 percent of the total employees is the same as faced in thousands of other mines in other countries. We are, thus, not dealing with strange, unknown problems, but with problems which are encountered in the United States and everywhere. It is emphasized that these problems are of very much greater magnitude in Belgium.

Specific instances are cited below where marked reductions in the labor force underground can be made without any basic change in mining methods. Each case has been selected because it is typical of a large

number of mines. Special cases, applying to only one mine, have been avoided.

5. Conveyor attendants.

The general practice in the Belgian coal mines is to have a man at the drive end of all conveyor drives. By using proper automatic controls, considerable savings in manpower can be effected. The coal industry advised that at the present time in Belgium it is required by law to have these attendants.

It can be positively presented to the Government that the type of control contemplated actually would provide greater safety than the use of men. For example, it has been found in the United States that where a man has virtually nothing to do during the course of a shift, he will become careless and will not pay close attention to his duties day in and day out.

After a number of conferences, it was agreed by the coal operators that the automatic control system is sound, can be put into effect, and will result in an important saving of manpower in the Belgian mines, which manpower will be free for other occupation.

6. Preparation work.

By careful planning, only the absolute minimum of rock galleries would be kept open so that the number of rock tunnels in use would be cut. This refers especially to cases where the preparation work is started too early and results in maintenance expenditures prior to the time these tunnels are used to produce coal. This would result in an important reduction in cost.

7. Conclusions.

The foregoing represents only a limited number of the total possible underground savings. They do indicate rather clearly the extent to which savings can be made in every coal mine in Belgium. It is also pointed out that the capital expenditure required to make these improvements can be repayed in some cases in a matter of months.

It cannot be emphasized too strongly that ultimate success can be achieved only by a complete integration of all the various phases of the operation. Unless this is done, then only limited benefits will be obtained in closing, probably as good an illustration of this as any is as follows:

At one mine, a capital expenditure of slightly over \$200,000 has been made to mechanize the manufacture of concrete blocks. Although the installation is more expensive than it warrants, the plant is well laid out. Only seven men are required to make the blocks, but after the blocks have been made, over a hundred are used to transport the blocks to the curing room, then to the area where they are aged, and then to be loaded into mine cars. A few hand-drawn carts are used for this purpose, but there is still a great deal of straight hand carrying and hand moving of the blocks.

With the use of fork-type industrial trucks, this number of men engaged could be cut about 90 percent. To handle this efficiently would require the use of palettes and flat mine car trucks. In this manner, the industrial truck could pick up a palette of ten or fifteen blocks and these blocks could remain on the palette as they went through the different processes. The palettes would be loaded directly on a mine truck and would be taken underground.

All of the foregoing may, then, be considered the first step in efforts to reduce the cost of Belgian coal. There will undoubtedly be habits of all kinds to overcome in this field with respect to individuals. This will require constant effort over a considerable period before the industry accepts modern methods.

It is thought that one of the most effective ways to do this will be to have small delegations of top-flight engineers come to the United States to see which methods in use there can best be adopted in Belgium. For these visits not to be of negative value, they should be carefully planned, and only those things in the United

States which can be applied to Belgian mines should be shown to them.

Appendix

Estimated reduction in labor in all coal mines in Belgium.

At the time this report was written the national productivity for all personnel at the coal mines was 0.67 tons per man day with a total work force of 165,000 men listed as being employed by the mines.

It is considered that these 165,000 men can be reduced to 110,000 listed workers (absentees included) to maintain the same production if their productivity could be increased to a national average of 1.01 per man day, absenteeism excluded.

This estimated reduction was based on the following: broad general observations at a large number of mines, a specific study at several mines and, in particular, at one 171-year old mine.

This mine is currently averaging 0.60 tons per employee actually working, as compared to the national average of 0.67 tons per man. If this mine is modernized, then a tons-per-man working of 1.26 should be obtained.

A 171-year-old mine naturally has many factors which require extra labor as compared with a 20-year-old or even 50-year-old mine. Since the natural conditions in this mine are only fair, it is thought that it is extremely conservative to estimate the national average tons-per-man at 20 percent below the tons-per-man at this mine, particularly when the leading Belgian engineers have agreed that in this mine 1.26 tons-per-man would be possible with the reservation that this proposed plan might involve an over-concentration of working places.

Face-operation.

The present longwall system is approved. It is considered that it is probably the only method that could be used successfully in Belgium.

The mechanization of the faces should be completed, but only after intensive study is made to determine the type of mechanization best adapted to a particular mine or to a particular seam in a mine. It should be noted here that the very facile means of face operations carried on in the United States known as the « room and pillar system », is not considered generally applicable in Belgium. The room and pillar system is many times more economical than the long wall face and much easier from an engineering viewpoint and work viewpoint than the latter. We do not believe that it should be considered at this time, although there is a possibility that this system might possibly be adapted in modified form to some seams in Belgium.

Main haulage.

Electric haulage locomotives are considered to be highly desirable where it is possible to use them. The Diesel locomotives now in use operate entirely too slowly. They should be speeded up.

Pit bottom layout.

The layout at the bottom of the pits should, where this has not been done, be redesigned and made modern and efficient as has been done in many of the mines in Belgium.

Rock gallery work.

Rock gallery driving should be mechanized, using any of the standard American systems. The system must be integrated so that mechanization is rounded. For example, in one mine a mechanical rock loader is being used. The changing of mine cars after the rock machine has loaded them is so slow that the time saved in

loading the rock is almost completely lost and there is no over-all saving.

At another mine, a jumbo drill is used to drill the rock face, but so much time is consumed in loading the rock and then laboriously setting cement blocks in place by hand that little benefit is obtained from the drill.

Both of these mines had planned to take these units out because of no savings. They now state that they plan to restudy the problem and to mechanize the functions susceptible to mechanization. A study should be made of the best method of preserving the rock gallery supports. There are large sums being spent in Belgium for the maintenance of rock galleries. If ways could be found in each of the districts to secure permanently these rock galleries, many millions of dollars could be saved annually.

Use of electric motors and portable air compressors.

Where possible, air motors should be replaced with electric motors. Consideration should be given to the possibility of using portable air compressors underground. At the mines visited, it was estimated that from 25 percent to 35 percent of the air was being lost between the air compressor on the surface and the actual workings. At one mine visited, the power cost alone for electricity to drive the air compressors was 76 cents per ton for the year 1949. At this mine, it was stated that if all air motors were replaced with electric motors and portable air compressors could be used, this 76 cent power cost could be reduced to less than 25 cents, and the saving in general maintenance of the air compressor lines would probably be 15 cents. The merit of a careful investigation of this phase is graphically illustrated when it is considered that if the statements made at this one mine are correct, and if they are typical of all Belgium, there is a potential saving of \$15,000,000 per year. However, in the present conditions it would not appear that the use of such machines could be adapted by all of the mines as, for example, those of the Campine coal area.

Experimental coal galleries.

It is suggested that an experiment be carried out to drive the coal gallery to its extremity and that until this has been completed, no coal be extracted. This would permit retreat mining and, since the coal gallery itself would already be in the center of a solid block of coal, it should be much easier to maintain this gallery. This has been tried and has met with varying success.

Improved conveyor technique.

At one mine 175 men are employed to load out rock from the bottom of the coal gallery, which has heaved because of the heavy weight. It is thought that it would be worthwhile to experiment with hanging the belt conveyor from the steel arches. Then, when the bottom heaved, it would not be necessary to load this material out except at intervals, if at all. If it were necessary, a loading machine and shuttle car could do this work.

Supervision.

It is considered that there is an unwarranted number of supervisors both underground and on the surface. (1) There is one mine in Belgium which is producing 6.7 tons-per-day per underground supervisor, and 6 tons-per-day for all supervisors. These figures are roughly comparable to the tons per man per day for all coal mine employees in the United States. A study was made of the mines producing 88 percent of the coal in Belgium. It was found that in four of the five districts the mine with the highest ton average per supervisor also had the highest ton average per underground employee. In the 5th district, the mine with the second highest ton average per supervisor had the highest ton average per underground employee. This is perfectly logical and is an anticipated statistic. Where the number of supervisors is excessive, inefficiency almost invariably results. If each of the mines in each district had the same number of supervisors per ton of production as the best mine in the district, then there would be an important reduction in the number of supervisors.

Blasting methods.

Consideration should be given to the use of Airdox, a recent American invention, in some of these mines, for blasting purposes. It has been found, in numerous cases in the United States, Airdox is definitely preferable to Cardox, which is in common use in Belgium.

Central shops.

There is absolutely no question in our minds that if a careful, accurate study is made of the economics of the huge central shops, concrete block plants, etc., at the mines, it will be found that a majority of these functions should be turned over to manufacturers who would furnish the desired equipment, or to coal companies' jointly-owned central shops for each of the districts.

Preparation plants.

It was found, without exception, at all mines visited that the preparation plants were much larger than required, that, basically, the plants were inefficient, required excessive power to operate, and because of the large amount of machinery, had an excessive maintenance cost. No preparation plant in Belgium was found that used virtually standard United States practices, which if adopted here, could cut by more than one-half, the capital and operating cost of the Belgian preparation plants.

The largest size coal being mechanically cleaned in Belgium today, insofar as we were able to ascertain, is 3-1/2 inches. (2) It is standard practice in the United States to wash up to 6 inches and, in some cases, to 8 inches. If this system were adopted in Belgium, then all except a handful of men, currently engaged in picking slate from the large size coal, could be eliminated. Based on the number of slate pickers required at mines visited, this could mean a reduction of 2,000 men.

(1) This is partially the result of the unusually high turnover of prisoners of war and foreign employees in the Belgian mines during and since the war.

(2) We have been informed that certain mines have gone to 5-1/2 inches.