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Expert Group Meeting on the Development  
of the Synthetic Rubber Industry

Snagov, Romania, 25 - 29 June 1973

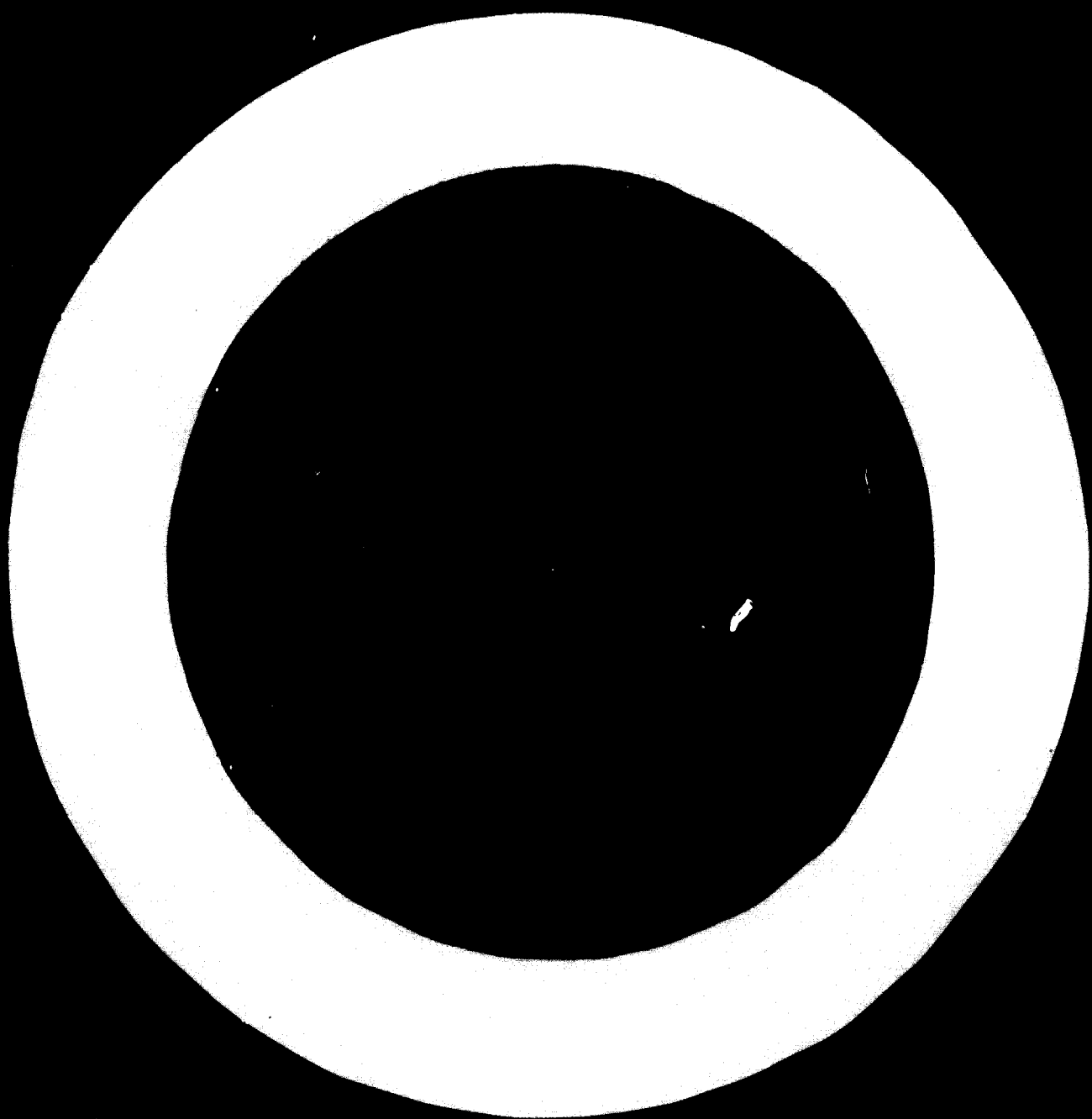
SMALL POLYMERIZATION UNITS FOR THE MANUFACTURE  
OF SYNTHETIC RUBBERS IN THE DEVELOPING COUNTRIES <sup>1/</sup>

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This UNIDO Meeting is ambitious and commendable. I welcome the opportunity of expressing a few of my thoughts to this distinguished body. On numerous occasions I have been disturbed to read broad assertions that synthetic rubber plants are viable operations for most developing countries. Since I am not an engineer, and, since most people suspect that I am prejudiced, I usually hesitate to argue on this subject. Being banker oriented, I find it difficult to equate national pride however natural and justifiable with hard currency economics.

If a developing country wants to have a rubber plant, or a steel mill, to avoid dependence upon imports of raw materials, usually it places its own value upon that independence. Frequently, that value is different from the value that would be used by a large international bank which customarily thinks in terms of plants that must be competitive in the world market. I refer to a country which doesn't want to give up an inherent right, whether economically sound or contrary to the apparent best economic interests of the country.

It is understandable that many of you here could feel it would involve a loss of pride for your country to give up a future synthetic

rubber industry -- even though you freely admit that the price paid for such a privilege would result in a disproportionately low or even a negative return on investment, and therefore, higher costs. From the point of view of many people at this meeting, this logic is sound. To judge such a position objectively, anyone should put himself in the country's frame of reference at the time the decision is being made.

A banker in Frankfurt, London, New York or Tokyo might consider such a venture an unsound risk, an unwise use of capital, and an unforgivable neglect of the obvious desirability of fostering labor intensive as opposed to capital intensive industries in an emerging nation.

I have lived in and worked to foster the development of an emerging country. I understand the price that says, "I want the plant for my country". However, I would deplore use of limited hard currency to develop the plant when the same capital could create so many more jobs, feed so many more mouths and earn or save foreign exchange for other uses which would hasten the development of the country while benefiting of the masses and not just a few proud government or industrial leaders.

In 1969 we undertook an engineering study to determine the probable cost of constructing a 20,000 ton per year polybutadiene plant. The cost that our engineers came up with was about \$300 per ton (£125), battery limits, U. S. Gulf Coast, not including office space, warehousing, off-plot facilities, land, factors to adjust for costs of local construction, process royalties, project organization cost, cost of organizing a new corporation, interest on loan during construction, pre-start up and start up costs or working capital.

Three years earlier, Mr. C. Mercier of France quoted a price of £160 per ton (\$384) for an unspecified type of stereo rubber plant. Probably he included the things I excluded when he calculated his price. This would be reasonable. Certainly his price is not out of line, depending on the country in which the plant was to be constructed. If my assumption is correct his quotation would be comparable to my earlier quotation.

Perhaps you wondered why I selected a 20,000 ton per year polybutadiene<sup>\*</sup> plant. This is the smallest size plant which can be constructed from what is commonly called "shelf" items. There was, and is, absolutely minimum economy which could be effected by building a smaller size plant. In fact, to construct a 10,000

\* The quotation given is for a multi-purpose plant designed for the capability to produce low cis polybutadiene, solution SBR and some other terpolymers.

ton per year polybutadiene plant probably would cost almost as much in total as the construction of a 20,000 ton per year plant since much of the equipment involved would have to be custom made and would cost much more than if it were a "stock item".

I haven't even considered an SBR\*plant for most developing countries even though SBR is considered a less expensive general purpose rubber and is in greater use than polybutadiene. Why? Because to construct a minimum size SBR plant from "shelf" components, it probably would have to have a capacity of at least 40,000 tons per year? This would make the cost about double that to build a 20,000 ton PB plant. Like the polybutadiene plant, there is little savings in total dollars by building a plant of smaller capacity because of the necessity for having components custom made.

Since Baku, several people have asked why, in Baku, I excluded the items mentioned earlier and quoted only costs on a "battery limits" plant. I did this because of the great variation as between countries and local situations in the investment required to take care of the items mentioned above. If a plant were constructed in conjunction with another existing manufacturing operation with existing services that are required to keep a rubber

\* Emulsion



plant operating, the cost would be lower than if all of the services and organization, as well as operation cost were absorbed by the rubber plant alone and required all new equipment or facilities. Based on 1969 figures, it is reasonable to say that if these items had been constructed independently, they would have increased the cost of the 20,000 ton polybutadiene battery limits plant by 40% to 50%. This is an additional two to three million dollars, and must be considered.

Gentlemen, since 1969, costs have gone up substantially. Today engineers guesstimate that if any one of you went back to your country and were able to get an approval to build a polybutadiene plant within six months, the earliest you could get it on stream would be 1976 or 1977. Also, they estimate the cost today would be about US\$355 per ton (£148), battery limits taking into consideration increased costs, improvements in processing techniques, etc., since 1969. However, to give the full picture we should talk about the total capital requirements to set up a rubber plant and we should assume no supporting facilities are available. On this assumption, total foreign exchange requirements today would be about \$530 per ton or just over \$11.5 million.

Now, let us look to the question of feedstocks. The

situation today is a lot more difficult from 1969. The cost of monomers has risen, availability has become uncertain and unreliable. Personally, with today's energy situation, I wouldn't want to build a rubber plant even in a developed country without a pretty firm and long range agreement with a supplier of my monomers. If you want more details regarding my reasons, see my paper presented in Baku in 1969.

Several other factors are worthy of comment. Today a 20,000 ton per year plant would not be viable or capable of producing rubber on a competitive basis in a developed country. Unless you are going to subsidize the cost of your monomers or your rubber, you are not going to be able to produce rubber in a 20,000 ton plant and anticipate exporting the surplus to earn foreign exchange.

The purpose of this meeting is to enable developing countries to reach their own conclusions based on objective technical and economic information regarding the appropriateness of establishing small scale synthetic rubber plants.

If I were helping to draw up a Five or Ten Year Plan for a developing country today, I would be extremely interested in the amount of money that would be required to construct the plant

locally, versus the cost of importing the national rubber requirements over a fifteen year period. I would calculate the cost of the money in interest and consider the number of people which would be employed as a result of the investment of foreign exchange by eliminating imports -- or whether it could be put to work in a way which would create more employment and raise the GNP of the country.

I am not trying to second guess any one of you, but let me suggest that you look at the headlines in the U. S., British, French, German, Japanese and Italian papers during the past year. What are the mass complaints? Fuel and food shortages and resulting increase in food costs and shortages of the feedstock derived from hydrocarbon fuels. China, Russia and India all are importing grains this year to take care of food shortages - and a number of chemical plants have substantially reduced operations because of lack of raw materials.

Our earth can produce the food-stuffs if we utilize the hybrid seeds and in many cases get water to the soil. \$11.5 million dollars, plus the cost of imported feedstocks and food to meet shortages, could make a substantial contribution towards creating employment for people in the construction of dikes and irrigation

systems to convert arid plains to productive fields. Utilizing rubber for soil stabilization, now a proven technique would enable a number of countries to increase their foodstuff production. Even a small percentage increase would enable many countries to meet their own food requirements (saving food import costs) and perhaps to earn some foreign exchange by exporting food surpluses.

Similarly, in many of the developing countries, a far greater contribution could be made by a single "one shot" importation of a number of specialty rubbers for the fabrication of reservoirs, flood control devices and inflatable dams -- all of which could be keyed to a health and food production program designed to meet local demands and for exportation. This sort of investment not only raises the local standard of living but can create foreign exchange earnings as a return on, and to amortize the original investment. Investment bankers would tend to favor this sort of an approach. The simplest example I can think of is to look at the large number of developing countries which experience a 5% to 40% loss of their food grain supplies to insects and rodents. I am not pushing one rubber as opposed to another, but insects and rodents dislike the smell of butyl rubber. A number of inflatable silo manufacturers have taken advantage of this. The savings in some areas have paid for the imported silos many times over. Such

production represent a constructive use of foreign exchange and well fed citizens are tapper citizens than hungry ones. In this case, the money saved on imported grains and other food to replace that eaten by rodents and insects could be used for other job producing programs.

In summary, the construction of a modern synthetic rubber plant is a major financial undertaking. There is a minimum size below which no new plant producing a general purpose rubber can be economically viable, however efficiently it is run. Specialty rubbers are in limited demand and are not a viable substitute just because the plants operate efficiently on a smaller scale.

No country, developed or underdeveloped, should consider building a new rubber plant without a thorough knowledge of the prospective market for the rubber, the cost of production and without an assured continuing reliable source of raw materials. Even with an assured supply of raw materials, a rubber plant probably isn't the most fruitful use of money for any developing country because it is highly capital intensive and low labor intensive. A small plant cannot produce competitively so there is no chance of recovering investment or earning foreign exchange by exporting finished product.

If national pride makes an airline, a steel mill and a petrochemical complex (including a rubber plant) essential, then the only thing to do is to hire the best international engineering firm available to conduct a complete feasibility study. When you know your costs, compare the expenditures involved over a fifteen year period with the return on investment in labor, higher standard of living, etc., if the same amount of money were invested in other projects and natural or synthetic rubbers were imported as needed. A business executive in a more highly developed country would be considered unsound if he built a rubber plant in any country without such a study.

With these possibly gloomy observations, let me say that you know, and I know, that values -- what is important -- vary as between cultures and countries. What may be important to an executive in a developing country, probably is quite different from what is important to an executive or banker in a highly industrialized country. What a London banker or I might consider unnecessary, conceivably might be considered acceptable -- even desirable to a government official or financier in a developing country.

If a developing country wants to build a rubber plant, it

probably will, regardless of the economics. I should warn that such a plant is going to have more problems and gain less for its capital invested (mostly foreign exchange) than would be possible if the same foreign exchange were invested in almost any other local industry. It will require a powerful man to should the responsibility if such a decision is taken.

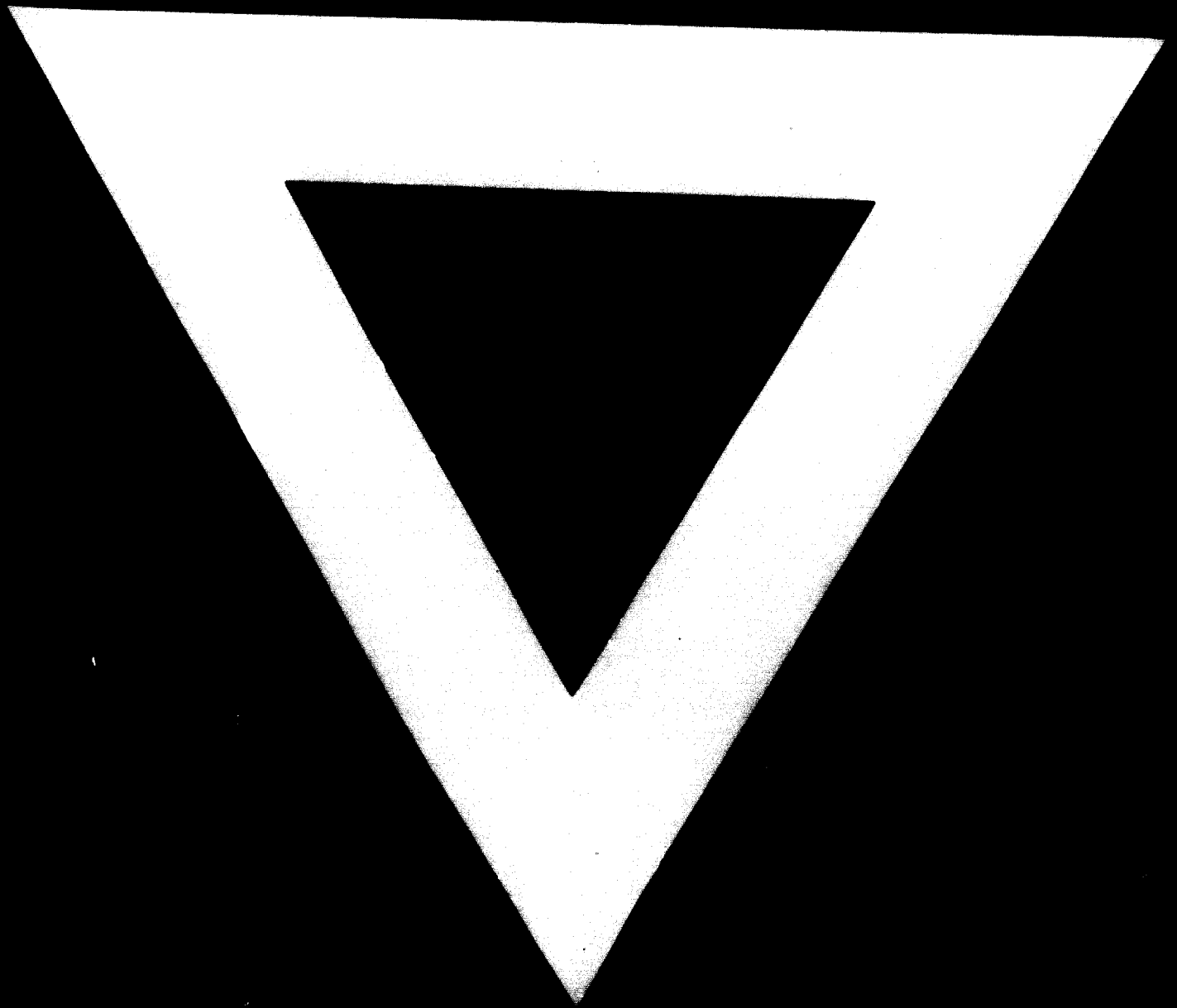
Perhaps I could clarify the point I am trying to make if I give you an analogy. It is possible to build a fifty story office building in New York or Moscow or in the middle of a desert town of 5,000 people. Such a building might make sense in New York or Moscow or Paris or London because the cost of land is astronomical by comparison and it is cheaper to build vertically than to build horizontally. Most of you would agree that it would be silly and uneconomic to build a fifty story building to provide office space for 150 people when a three or four floor building spread over several acres would provide the same accommodation for a fraction of the cost.

If you want to build a rubber plant or build a fifty story office building in the middle of a desert as a matter of pride, it may not represent sound judgement from the point of view of a financier or banker or business man in a developed country. If

your frame of reference in a developing country makes it reasonable or acceptable, that is a decision for your government officials and the men whose capital is going to be involved.







**12.8.74**