T.I.C. Activities

The Twelfth General Assembly of the T.I.C. was held on Monday October 29th 1979 in Brussels at the Cercle Royal Gaulois. The membership conducted the business of the T.I.C. as follows:

— In view of the recent increase in the total number of member companies and in order to represent fully the various sectors of the tantalum industry belonging to the T.I.C., Article 13 of the T.I.C. Charter was amended to increase the number of members of the Executive Committee to seven, including the President.

— The new Executive Committee for the year 1979-1980 was elected by the membership
  Mr. Brian Reynolds, President
  Mr. Joseph C. Abeles
  Mr. Herman Becker-Fluegel
  Dr. George J. Korinek
  Mr. Paul Leynen
  Mr. David E. Maguire.

One vacancy remains which will be filled at a later date.

— Two new companies were elected to membership.
  Mamore Mineracao e Metalurgia S/A
  Minex Corporation Sdn. Bhd.

— The T.I.C. will sponsor an additional phase of the study made during 1976 which was the first comprehensive attempt to define the tantalum material supply and demand situation. The new phase will evaluate the changes in both the market and the supply of tantalum and identify the trends which will shape these factors during the 1980’s.

— The T.I.C. will expand and improve its compilation of statistics to include those relating to the production and processing of tantalum.

The Assembly reviewed the recent activities of the T.I.C. under the able guidance of Mr. Abeles as President. Appreciation for his efforts was expressed by the membership. Mr. Brian Reynolds, the new President of the T.I.C., has long been associated with the tantalum industry, formerly as the Managing Director of KBI-Billiton in Arnhem, The Netherlands, and, for the past three years, as Head of the Tin and Special Metals Division of Billiton International Metals in The Hague. He is the official representative of the Thailand Smelting and Refining Co. Ltd. of Phuket, Thailand.

After the formal business of the Assembly, two presentations were made to the membership which reflected a generally optimistic outlook on the future growth of the tantalum capacitor market and emphasized the need for increased availability of tantalum at stable price levels. These presentations are published in this edition of the “Bulletin”.

Discussions following the addresses indicated that the mining industry is already responding to the increased needs of the market by expanding production and conducting substantially greater exploration efforts toward the discovery of new properties with tantalum mineralizations.

After deciding that the Thirteenth General Assembly would be convened on Tuesday May 6th 1980, at a place to be selected, the Twelfth General Assembly was adjourned.

T.I.C. Twelfth General Assembly

On October 29th 1979 the Twelfth General Assembly of the Tantalum Producers International Study Center convened at the Cercle Royal Gaulois in Brussels. Thirty of the present thirty-seven members were represented.

The membership elected the Executive Committee for the coming year, increasing the number of members to seven, but leaving one vacancy at present. Mr. Brian Reynolds, Head of the Tin and Special Metals Division of Billiton International Metals in The Hague, as the representative of the Thailand Smelting and Refining Co., was elected President of the T.I.C. for the year 1979-1980.

The Thirteenth General Assembly of the T.I.C. will be held on Tuesday May 6th 1980. The location of this meeting will be announced later.

Presidential Address to the T.I.C.

During the Eleventh General Assembly of the T.I.C. at Perth, Western Australia, on May 14th 1979, Mr. Joseph C. Abeles addressed the membership. Space limitations in issue no. 19 of the “Bulletin” precluded publication of that address before this time. Mr. Abeles’ remarks follow.

In the last year, since the meeting in Rothenburg, there have been substantial increases in the prices of tantalite and tantalite products. Many consumers have become
The Short and Long Term Outlook for Tantalum Capacitor Demand

The following paper was presented at the Twelfth Generals Assembly of the T.I.C. by Mr. D.E. Macgilla, Vice President, Electronics Division, Union Carbide Corporation, Greenville, South Carolina USA.

I would like to cover two items. The first is that the tantalum capacitor business is alive and well in spite of the severe shocks dealt to it over the past twelve months. The second item is a plea for some measure of stability within the tantalum industry.

The tantalum capacitor industry has survived a year of unprecedented shocks and disruption. The cost of tantalum capacitors to users had been declining for well over 20 years as is typical with an electronic component passing through its product life cycle. Suddenly, however, the price of ore quadrupled from $25.00 to $100.00 per lb. contained. Suddenly, the mining portion of the tantalum industry was demanding an extra $150 MM for the same $350 MM that was paid last year. The tantalum powder and wire producer sector of the tantalum industry began immediately to pass through their extra "costs" in various degrees to the capacitor producers. Union Carbide took the leadership role in passing through these extra "costs" to capacitor users. That leadership role was temporarily costly in terms of market share bookings; however, all of the business and then some returned as others were unable or unwilling to ship product at obscene prices.

The impact on the capacitor industry was quite mild in terms of total volume, but the nature of the industry has changed. The consumer electronics portion of the tantalum capacitor industry is now dead. When the costs of the capacitors began to rise, they were simply designed out of the circuits and replaced primarily with aluminum electrolytics.

As this was occurring, the computer and automotive applications for tantalum capacitors were increasing. In consumer applications, the price-demand response curve is very inelastic.

The cost differential in design in aluminum capacitors in place of tantalum capacitors has always existed. Last year, large $1.00 tantalum capacitors could have been functionally replaced with a $0.20 aluminum electrolytic capacitor. Today, that same tantalum capacitor cost is over $2.00 and the aluminum capacitor cost is $0.25, so the incentive has increased. But because it is an aluminum electrolytic, we will not use the equivalent tantalum capacitor. Many high level worlds decided to use about two billion tantalum capacitors this year.

On the low end of the tantalum capacitor range, there has been an attempt to use simple leadless aluminum electrolytic capacitors with monolithic ceramic capacitors. This replacement generally has been in values less than 1 μf and will probably extend into the 1 μf range as the manufacturing costs of monolithic ceramics are reduced through improved materials and processing technology. But these tiny tantalums do not use much tantalum material and they do not generate very many sales dollars. Substitution of values much over 1 μf will not be practical in the 5-7 year period immediately ahead.

In industry, the rise in cost of tantalum capacitors will not be disastrous to the market demand growth for this state-of-the-art component. The real threat to long term market growth is the prospect of limited availability of the capacitors due to limited availability of the tantalum metal.或许 such a factor of equipment production can be absorbed or passed on to the ultimate consumer. But the absolute unavailability of a factor of equipment production is a disaster long remembered in the industry. For example, IBM, Western Electric, Siemens, and General Motors are examples of the world's major users of tantalum capacitors. If any of these companies are forced to delay shipments of computers, communication equipment or automobile electronics due to lack of tantalum at any stage of equipment such as a tantalum capacitor, there will be directives from the highest levels of management to design this component out of the system— even at the expense of end product performance. The occurrence of such a shortfall in availability is the primary threat to the long term growth of our industry.

Over the past six months or so, we have heard remarks to the effect that "maybe we should divert available supplies of tantalum into the military market." Other tantalum capacitor producers and we are reduced through improved materials and processing technology. But these tiny tantalums do not use much tantalum material and they do not generate very many sales dollars. Substitution of values much over 1 μf will not be practical in the 5-7 year period immediately ahead.

In industry, the rise in cost of tantalum capacitors will not be disastrous to the market demand growth for this state-of-the-art component. The real threat to long term market growth is the prospect of limited availability of the capacitors due to limited availability of the tantalum metal. But the absolute unavailability of a factor of equipment production is a disaster long remembered in the industry. For example, IBM, Western Electric, Siemens, and General Motors are examples of the world's major users of tantalum capacitors. If any of these companies are forced to delay shipments of computers, communication equipment or automobile electronics due to lack of tantalum at any stage of equipment such as a tantalum capacitor, there will be directives from the highest levels of management to design this component out of the system— even at the expense of end product performance. The occurrence of such a shortfall in availability is the primary threat to the long term growth of our industry.

Over the past six months or so, we have heard remarks to the effect that "maybe we should divert available supplies of tantalum into the military market." Other tantalum capacitor producers are doing it. If we all do it, the military market will quickly absorb all the tantalum we can produce.

Now, as a tantalum capacitor producer, I am not inviting a further increase in the cost of tantalum powder and wire. But, frankly, a 20,000 $/gram tantalum powder represents an insignificant value added to the tantalum atoms which should and will be shared with the tantalum processors and the tantalum capacitor producers.

Union Carbide has supreme confidence in the future growth of the tantalum capacitor market demand. We built an ultra-modern tantalum capacitor production facility beginning at the onset of the 1975 recession. As a consequence, Union Carbide accounted for over 75% of the total added capacity in the United States since the 1974 cyclical demand peak. During the same time frame, we quadrupled our production of tantalum capacitors in a new plant in Aycliffe, United Kingdom, to serve the European capacitor market. Now, in the midst of the most
The Effect of recent Tantalum Price Rises and Shortages on Capacitor Manufacture

The following paper was presented at the Tantalum General Discussion of the T.C.O.G. by Mr. R.W. Franklin, Principal Engineer, J.T. Components Group, Capacitor Product Group, Paulton, England.

Electronic component manufacture is a very competitive business and in Europe at least, the return on sales for the industry as a whole is probably less than 5%. In order to control this business it is obviously essential to have a good estimate of the cost of production. As a capacitor manufacturer offers numerous combinations of capacitance and voltage in several different styles, the total costing exercise involves many assumptions about future product mix, output volumes, yields, special selections, material price movements, etc. It is usual to carry out this total costing exercise once a year and then to monitor performance against these standards throughout the year. Any serious discrepancies need corrective action within the production area, or, as a last resort, as a price increase. I say “as a last resort” because there is only a limited part of the trade.

The diagram shows the price fluctuations and the impact on the industry. The upper chart illustrates the price increases and the lower chart shows the effect on sales.

A cycle when price increases are likely to be accepted without loss of business. This point can be explained in more detail through two charts. In the first, the effect is shown as a drop in demand for electronic equipment on component production.

Consider a case where the demand for equipment is fairly steady until some disruptive event, such as a recession or government action causes a drop in demand. Since there are unsold stocks in the warehouses, the equipment manufacturer cuts his output by more than the loss of sales. But, at the same time, he cuts down his inventory of components to a level related to this new output. As he already has stocks, his orders for new components cease for a period and he re-schedules orders already placed. In other words, the component manufacturer is at the whip-end and a change in equipment orders has a significant effect on capacitor sales. The capacitor manufacturer, however, cannot turn off his output as rapidly as the change in orders and develops a large number of finished goods. Too acts like the equipment producers and cuts his tantalum purchases sharply.

The second chart shows a variation where the cut-back comes after a period of increasing sales as happened a few years ago in the last major recession. As the demand for component had been exceeding output capabilities, appreciable double ordering occurred as purchasing managers attempted to guarantee that their assembly lines were receiving adequate supplies. When the cut-back happened, not only were there no fresh orders but the excess orders also were cancelled. If the month, due to cancellations, our order intake went negative by an amount equal to our normal monthly sales. There was a scramble for the remaining capacitor orders and selling prices dropped. This happened at the time when costs were going up due to reduced volume and drastic action was needed within the manufacturing area to limit expense items and labour costs. Since the only time when an individual manufacturer can get a price increase accepted by the market without loss of business is in a period of near capacity output, a situation now exists where the selling price does not logically follow the normal cost movements. As previously stated, the reaction to cost increase is normally within the production area first and as a price rise as a last resort.

Even when the market will stand an increase, every increase makes the tantalum device more liable to replacement by some other kind of capacitor, ceramics at the low CV and or aluminiums at the high end. By far the biggest single item in the cost make-up of tantalum capacitors is the purchase cost of tantalum powder and wire. Any significant price movement of these metal items will seriously erode profit margin. When calculating unit costs, we build-in anticipated shifts of costs in all items for the coming year, not necessarily all increases as there are appreciable cost improvements through process development and mechanisation. However, the uplift in the tantalum price has so exceeded the anticipated move-
ments that this eliminated all of the margins built into the costings. Tantalum was not the only material to rise by more than 50% during the year. Tenax was up from £120 per kilogram at the beginning of the year and rose steadily to £180 by August. Then suddenly in September it jumped to £250.

Our reactions to material cost increases are always directed initially to finding ways of reducing our purchases. After years of working on this, we have found that we are faced with large increases in the price of nickel wire which was used as terminations. Now, in large part of our own range, that nickel has been replaced by cheaper steel wire. This is performing the same function as the nickel, and the changeover caused no difficulties in assembly. The main delay in the move was establishing suitable suppliers. Similarly, with the silver, we have introduced big savings. Firstly we developed our own silver dispersion which was equivalent to the proprietary grade that we had been purchasing. That was a saving by itself. Then the production department carried out research and development work that we have been carrying out we have not been able to react quickly enough to keep costs steady. Therefore we have been forced to pass on some of the price rises as a tantalum metal surcharge. As said earlier, our chances of getting more for our capacitors depends on the state of the market. Recently a significant demand for solid tantalum capacitors has been near to production capacity and delivery lead times have become extended. This has created the appropriate conditions for getting the surcharge accepted without an immediate loss of orders.

Naturally, all tantalum capacitor manufacturers are affected by the recent events but not necessarily to the same extent. At the beginning of the year the differential between the various powder suppliers was fairly small and arrangements were set up based on individual preferences related to powder types. Now there is a substantial spread between the different suppliers and so manufacturers are seeking ways to achieve the contract volumes set up previously. Why do we not all switch to the cheapest powder supplier? In the same way that capacitors can't all be the same capacity, so is powder supply. There is no room at this present time for manoeuvre. However, if that situation changes, say due to a drop in capacitor demand, you can be sure who will lose their powder orders first, unless, of course, prices level off before then.

At this present time there is some concern regarding a material shortage but firms who have arranged adequate contractual supplies are not affected directly. However, indirectly the whole industry is affected because of the effect on capital investment. Injection of substantial capital would not be justified if (a) there is insufficient tantalum available to allow expansion or if (b) there is a loss of business to aluminium or ceramics due to increased price differentials. We need some hard facts on price and quantity limits to clarify this situation. If there were a drastic cut-back in powder supplies we would need to concentrate our product mix on those bringing in the biggest sales per kilogram of powder used. This would affect the number of the higher CV capacitors and increasing the risk of permanently losing that part of the range to aluminium electrolytics. We have tried discreetly to assess our customers' intentions over the replacement of tantalum by aluminium electrolytics. Not all major UK customers have hinted that they are actively designing out tantalums. Our estimate is that up to 25% of the present volume may have the tantalum surcharge but that scope for change is very short while in others the change will not come until the next generation of circuits. The competition from aluminium is present at all values above 1 μF.

Below 1 μF the competition is from ceramics but here it is interesting to note that that form of capacitor at present uses substantial quantities of precious metals whose prices have also been rising rapidly. It is common for the higher CV ceramic multilayer capacitors to have a material surcharge similar to our tantalum surcharge but this time related to the cost of the precious metal content.

It is too early yet to give a considered opinion on how much business will be permanently lost. A 25% cut would have a very substantial impact because in most cases this would take the volume down below the break-even point at present selling prices. It would produce a substantial over-capacity in the industry if it happened suddenly. We are keeping a close watch on the situation but so far we can find only isolated cases of the change-over having happened. The next six months could be crucial in this respect.

To sum up the situation:
1. It has been impossible to absorb all the tantalum price increase and so a material surcharge has been added to the capacitor selling price.
2. It will be difficult to maintain these prices if the capacitor output volume drops.
3. Efforts to reduce the tantalum usage will continue at a faster rate.
4. Although there are hints of a replacement of tantalums by aluminium electrolytics, the change-over has so far been slight.

The T.I.C. is Five Years Old

The Tantalum Producers International Study Center was given official recognition under Belgian legislation and granted legal capacity by the Royal Decree of 24th October 1974. Thus the T.I.C. is now five years old.

The stated general aim of the T.I.C. was "to become a well substantiated and organized organ for inflating statistical, geological, technical and other information on tantalum and more specifically on the tantalum raw material market". Recent prospects show that the T.I.C. has been quite successful in attaining this aim. The T.I.C. has:

- held a series of meetings, as General Assemblies, to consider the business of the T.I.C. and to provide a platform for the interchange of information;
- organized and sponsored the First International Symposium on Tantalum held in Rottenburg, West Germany, in May 1978;
- expanded membership from the original 12 producer members to 39 members including processors, consumers and merchants;
- sponsored two extensive studies covering the needs of the tantalum industry and assessing the supply-demand relations in the business;
- published twenty issues of the "Bulletin", the only international publication devoted solely to tantalum and columbium;
- collected and published data annually covering the production of concentrates and tin slags by producing members.

Nine of the General Assemblies have been held in Brussels, the headquarters city of the T.I.C. The other three provided members the opportunity to visit two mining operations, at the Tantalum Mining Company of Canada and at Greenbushes Tin L.N. in Western Australia, and one processing plant at Gesellschaft für Elektrometallurgie in Nuremberg.

The distribution of the "Bulletin" has reached four hundred copies per quarterly issue and is sent to all corners of the earth. Articles have been published covering every facet of the tantalum industry, from the geological aspects of tantalum resources to the end-use of tantalum in supercondensers. There has been considerable coverage of individual key companies and many general articles on processing and the market conditions. Through the "Bulletin", every reader has become familiar with the operations of both suppliers and consumers.

NEW MEMBERSHIPS

During the Twelfth General Assembly the following companies were elected to membership:

- Moret Mining Corp.,
- Minex Corporation Sdn. Bhd.,
- Rua Haddock Lobo, 578 - 2nd and,
- Metalurgica S/A,
- 114 Balfield Street,
- Calixa Postal 11931, CEP 01414,
- Ipoh, Malaysia,
- Sao Paulo, SP, Brazil.