



A/C Pipe
Producers Association

Internal Correspondence

TO Tenth Annual Meeting Attendees

FROM Mary M. Jackson

SUBJECT 1982 Industry Conference

DATE November 17, 1982

Staff is pleased to enclose the Proceedings of "VISTA '82", AACPP's Tenth Annual Meeting and Industry Conference held May 2-6, 1982, in Cancun, Mexico. The publication date is somewhat later than planned and Staff appreciates your patience during preparation of the Proceedings.

AACPP was unable to tape this year's Industry Conference; and therefore, several presentations appear in an abbreviated form. Where available, graphics used by a speaker have been included.

Enclosure

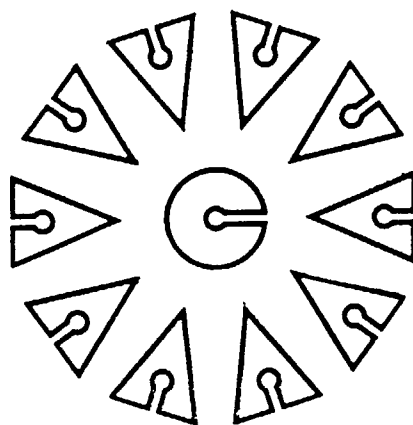
cc: A. Kahn, Esq.



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VISTA '82



**CONFERENCE
PROCEEDINGS**

A/C PIPE PRODUCERS ASSOCIATION
TENTH ANNUAL MEETING AND INDUSTRY CONFERENCE
CANCUN, MEXICO
MAY 2-6, 1982

TABLE OF CONTENTS

	<u>Page</u>
WELCOMING REMARKS by Lloyd C. Ambler	1
ECONOMIC OUTLOOK: U.S. by Margaret A. Timothy, Ph.D.	3
MARKET OUTLOOK: U.S. by John L. Fischer	56
RESIN OUTLOOK: U.S. by Fred Timpe	61
FIBER OUTLOOK: U.S. by Warren Whitley	66
OPENING REMARKS - SESSION II by Etienne van der Rest	76
REGULATORY OUTLOOK: E.E.C. by Etienne van der Rest	77
MARKET OUTLOOK: E.E.C. by Bernard Giboin	81
MARKET OUTLOOK: GERMANY by Robert W. Dorner	88
MARKET OUTLOOK: MEXICO by Luis Cejudo Alva	90
MARKET OUTLOOK: FAR EAST by Harry A. Hudson	101
REGULATORY OUTLOOK: U.S. by John F. Welch	111
MUNICIPAL ANALYSIS PROGRAM by G. Wade Miller	115
AACPP PROGRAM UPDATE by John F. Welch	130
STATE OF THE INDUSTRY by Joseph C. Jackson	133

WELCOMING REMARKS
by
Lloyd C. Ambler
Chairman
A/C Pipe Producers Association

Good morning. As Chairman of the A/C Pipe Producers Association, it is my pleasure to welcome you to Cancun and to our Tenth—and by far our most critical—Industry Conference.

As always, Joe Jackson and his staff deserve our thanks for finding and arranging for this outstanding meeting site and for their usual good planning and organization that you will see reflected in the content and quality of our meetings over the next few days.

As recently as our Ninth Annual Meeting (one year ago), it was difficult to foresee the degree to which our markets for A/C pipe, both in the United States and worldwide, were going to shrink. We recognized, at that time, that our industry had seen a retrenchment to its core markets. We are now seeing at an accelerating rate other materials intruding into what we once thought were established A/C pipe markets, and we see that we have this problem in common, perhaps to less degree, with our international members. While developing countries may still offer growth potential for A/C pipe, we see an increasing problem of acceptance of A/C pipe in the more developed countries.

In short, ladies and gentlemen, what we see today is our industry in a survival mode. Our survival—the continued existence of our companies as we know them today and our businesses—depends on fighting off the intrusion of other materials into our established core markets. The problem is much more complex than simply the health issue. I believe that the questions of the health effects of A/C pipe are now an underlying negative influence, but the many other complex non-health-related factors which have led to the market shrinkage we have seen will now require even more sober thought and harder work to make our survival possible.

These coming few days are a time for true professional candor. We will hear the latest and most accurate assessment from our member companies of what the facts are and what the demand for our product is expected to be over the coming five years. This broad-based analysis can lead to better solutions; but to do so, we will all have to stay within the narrowing area of neutrality between unrealistic despair and unrealistic optimism.

With that broad-based, factual analysis, I am confident that we can together address our problem areas and find a viable balance between world-wide demand for our products and our efficient capacity to meet it.

While we are dealing with our survival here, we must all recognize another critically important fact. Our major customers, and so our major markets, have sensed some hedging—a slight lack of confidence—in the A/C pipe industry as a whole. We must bear in mind that everything we do—as individual managers, as companies, and collectively as an industry—has two effects. First is, of course, the direct effect of the actions; and second, perhaps even more important, is the interpretative impact our actions have on our customers and markets. The signals we send out can have as much effect on the outcome of our survival crisis as do the actions that generate those signals. Those whose survival depends on success are obviously the best equipped to deal with a situation. I think this room contains the most qualified and, in fact, the only people in the world who can determine whether or not our industry survives. Each of us—through our commitment, the commitment of our companies, and the interpretative impact of our actions—can cause our industry to survive.

If you have had the opportunity yet to read something about Cancun or to explore it a little bit, you probably know that this was once the playground of ancient Mavan

kings and nobility. The successful and wealthy Mayan empire chose Cancun for their playground. There is a contrast there; we have come to this playground with a great deal of serious hard work to do, and I suspect that our collective wealth does not approach that of the first "vacationers" here.

You will also discover that those ancient Mayans had their own survival crisis. The cities and temples they built now lie abandoned and in ruins, some of them hidden by the jungle. Scientists have yet to come up with a good explanation of what that survival crisis was or why the Mayans disappeared so suddenly.

Therein lies another sharp contrast with our Association. We must assess the threat to our existence with realism, not superstition; and we must act collectively and effectively so that in future time the A/C pipe industry will not be found abandoned and in ruins untimely.

Thank you.

ECONOMIC OUTLOOK: U.S.

by

Margaret A. Timothy, Ph.D.

Vice President of Planning and Marketing Research

Pipe & Plastics' Group

CertainTeed Corporation

I'm sure it will come as no surprise when I tell you that it has never been harder to get a reliable "fix" on the economic future (Slide 1). No one, not even the experts, seem to be deriving the same conclusions from the same set of facts; and consequently, there are as many economic outlooks as there are economists.

The approach I will use with you today will be similar to what we used last year. We will first identify where we are in the business cycle, then explore the implications of this position and finally draw conclusions about where that position will probably take us.

Let's take a moment to review the methodology used in the analysis so that you will be able to interpret the graphs easily and quickly.

You may recall that last year we used rate of change curves or pressure curves to determine where we are in the business cycle (Slide 2).

A rate of change curve may be derived in three easy steps (Slide 3).

- (1) You need a year of monthly data from which to obtain a twelve-month total.
- (2) In the following month, a new twelve-month total is obtained by adding the data for the new month to the previous twelve-month total and subtracting the data for the same month in the previous year.

This procedure is repeated until 13 months of monthly totals have been obtained.

- (3) Then, the rate of change in the twelve-month moving total may be derived by dividing the most recent twelve-month total by the twelve-month total of the same month in the previous year.

No matter what economic time series you wish to track, this technique provides a curve that looks like this (Slide 4). (This assumes, of course, that you have a sufficient number of observations to cover a business cycle.) The base line is the 100 line—the line of no change or no growth. If the rate of change is greater than 100, the point, when plotted, will fall above this line; and conversely, if the rate of change is less than 100, the point, when plotted, will fall below the line.

The use of this technique permits you to identify whether your business is:

- (1) in a growth posture
- (2) enjoying prosperity
- (3) in a warning zone
- (4) in recession
- (5) in depression
- (6) in recovery

The first time series which we will analyze, using this technique, is the coincident indicator index computed by the United States Department of Commerce (Slide 5). You will recall that this index is considered a measure of the level of general economic activity. The index contains four components:

- o Non-farm employment
- o Industrial production index
- o Personal income less transfer payments
- o Manufacturing and trade sales

When we derive the pressure curve for this index, we get a graph that looks like this (Slide 6). Note the recessionary period in 1970 and 1971, the much deeper recession in 1974 and 1975 and the more current downturn that began in May, 1980.

The next time series we will work with is the leading indicator index (Slide 7). This index contains twelve time series. These are:

- o Average manufacturing work week
- o Manufacturing layoff rate
- o Manufacturers' new consumer goods orders
- o Index of Net Business Formation
- o Index of stock prices—500 common S&P
- o New plant and equipment orders
- o Building permits
- o Vendor delivery performance
- o Inventory change
- o Change in sensitive prices
- o Change in total liquid assets
- o Money supply

This index measures the degree of positive stimulus the economy is receiving. Because some of the stimulus expressed by this index is also inherent in the coincident indicator index, I chose to form an economic accelerator by deflating the leading indicator index by the coincident indicator index (Slide 8).

The curve derived from this ratio (Slide 9) shows that there was positive stimulus to the United States economy in 1971-1972 and again in 1976-1977. Note the recent three-year period in which there has been no positive stimulus to the United States economy.

The next time series to which this technique was applied is the lagging indicator index (Slide 10). This index includes six time series. These are:

- o labor cost per unit of manufactured output
- o manufacturing and trade inventories
- o commercial and industrial loans outstanding
- o average duration of unemployment
- o ratio of consumer installment debt to disposable income
- o average prime rate

This index measures the degree to which economic activity is being retarded or depressed. A logic, similar to that used in deriving an economic accelerator, was applied here to derive an economic brake (Slide 11).

This economic brake expressed as a curve looks like this (Slide 12). It tells us that the braking mechanism in the economy was relatively strong in 1970, in 1974 and 1975 and that economic activity has been slowing since 1978.

When we plot all three curves on the same graph, we observe an interesting phenomenon (Slide 13). We note that the economic accelerator and economic brake cross each other at the trough of a recession or peak of prosperity. Note the four points noted here: first quarter 1971, the trough of a recession; third quarter 1973, peak of prosperity; fourth quarter 1975, trough of a recession; first quarter 1978, peak of prosperity. The fifth crossing, noted on the graph, was the one I was predicting at this meeting last year.

Let's look at an enlargement of this portion of our curve (Slide 14). The two curves did cross as we expected in May of 1981, suggesting that the recession had bottomed and that the economy was moving into a recovery period. However, you will notice that the curves crossed again in August, 1981—but the opposite direction! This suggests that the braking mechanism of the economy is increasing and that those factors which accelerate or provide the impetus for positive change are affecting less and less of a stimulus. The conclusion is clear: the economy does not appear to be recovering; rather the United States economy appears to be moving into another recessionary period (Slide 15).

Of importance in this analysis is the comparison of change between the rate of change observed in the coincident indicator index and the rate of change observed in the economic accelerator. In previous recessions, when the economic accelerator moved below the 100 line, as it is now doing, the coincident indicator remained in a positive growth mode for a period of at least one year. That is not the situation today. Currently (March 1982), the coincident indicator registers 100 on the pressure curve and its trend is negative, not positive. This means that both indexes are entering the recessionary phase of the business cycle simultaneously. The economic accelerator is not only below the coincident indicator; but in addition, the economic accelerator is dropping at a faster rate than the coincident indicator. This should alert us to expect a recession unlike any experienced in the past decade.

With these conclusions in mind, I would like to direct your attention to a more detailed look at the United States economy. To do this, let's use the concepts most economists use to analyze total demand in the economy. Total demand for goods and services purchased in the United States is measured by economists in a concept known as Gross National Product (Slide 16).

There are four components of Gross National Product (Slide 17):

- o Consumption, the largest, which accounts for 64% of Gross National Product;
- o Gross private domestic investment, the most volatile sector of the economy, which accounts for 13.7% of Gross National Product;
- o Net exports—the smallest component accounting for 2.8%;
- o Finally, the government sector of the economy which accounts for 19.5% of Gross National Product.

Let's direct our attention to the consumer segment of the economy (Slide 18).

Consumer demand is made up of three parts (Slide 19):

- o Expenditures by consumers for services
- o Expenditures for durable goods
- o Expenditures for non-durable goods

As you can see, demand for services is the largest component while demand for durables is the smallest. Demand for services (Slide 20) seems to be unaffected by recessions. This category has grown consistently since 1973. You can see, however, from the slide that the rate of growth in this sector is much smaller in 1981 than it was in 1978 or 1973. Of significance in this analysis is the fact that the rate of change, although still positive, has been decelerating since the second quarter of 1981. Because these changes have been so small relative to the base, they are almost imperceptible on this graph.

Non-durable goods (Slide 21) is the second most important segment of consumption. The slide shows that this segment of demand is sensitive to recessionary forces and, surprising as it may seem, shows that this sector has made a remarkable recovery from the 1981 recession.

Durable goods, the smallest component of consumption, is remarkably sensitive to recession (Slide 22). Consumers find it relatively easy to postpone the purchase of autos and furniture in response to real or perceived decreases in income. Note that this section of the economy is poised to enter another recessionary period.

When we put the three segments of consumer demand together, we get a consumption (Slide 23) function that has exhibited a consistently positive mode. It is obvious, however, that the rate of growth in this sector of the economy has slowed considerably from the strong rates of change observed from 1976 through 1979.

Let's examine the investment function of the economy next (Slide 24). This sector of the economy (Slide 25) consists of four parts:

- o Investment in inventories (shown here as the change in inventories)
- o Investment in housing which accounts for 19.5% of all investment at present;
- o Investment in non-residential construction, and finally;
- o Investment in producers' plant and equipment which accounts for about 54% of all investment in the economy.

Business inventories (Slide 26) are extremely sensitive to recessionary periods as companies cut production in response to declining sales. Note the degree to which inventories have been reduced in the first quarter of 1982 compared to the behavior of inventories in the 1975 recession.

The housing industry (Slide 27) does not seem to be recovering. The slope of this function gives little, if any, hint of a turnaround.

The boom in office building (Slide 28) that has been taking place in the United States in this section has disguised the decline that is taking place in other sectors of non-residential building. A softening in this upward trend is highly probable in the second quarter.

Investment in Producers' Durable Equipment (Slide 29) measures the magnitude of outlays for new plant and equipment. It is obvious that outlays of this nature have been declining for some time. When all four segments of investments are viewed as a single entity, we get an investment function which, while still in a growth mode, has entered the warning portion of the rate of change curve (Slide 30).

The export function of the economy (Slide 31 and 32) you will recall, comprises only 2.8% of gross national product. Exports in the first quarter of 1982 (Slide 33) amounted to \$158 billion compared to imports of \$116 billion. As we examine the rate of change curve for this segment of the economy, the significant decline should not surprise us given the relative strength of the United States dollar and the current level of interest rates.

Government (Slide 34) is probably the most interesting segment of all demand given the plans of the present Administration (Slide 35). The Government sector is composed of two parts—those goods and services demanded by the Federal Government and those demanded by the State and Local Government. Of the two, State and Local

Government is the larger segment. Despite the much talked about decline in Federal Government spending, Federal demand is increasing (Slide 36). This should not surprise us given recent unemployment and the current level of defense spending. State and Local Government expenditures (Slide 37), on the other hand, have been in a negative growth mode for the past three months and are still declining. The end result is that the government function (Slide 38) which, while still in a positive growth mode, has begun to soften as the decline in demand demonstrated by State and Local Governments offsets to date the increase in demand demonstrated by the public sector.

When we tie together the total picture, we find an economy poised to enter another recession. What could happen to create a turnaround? Let's turn to interest rates (Slide 39). Here I have calculated a rate of change curve for the inverse of the prime rate (Slide 40 and 41). I have used the inverse so that we can relate the movement in the prime rate to some other functions of interest to us. In this graph we see the prime peaked in November of 1979 (remember, we are working with the inverse) and then fell through May of 1981. It then rose again until November of 1981 and has been falling ever since.

This graph (Slide 42) expresses the rate of change for housing demand as measured by the number of starts rather than by the number of real dollars expended by consumers. It is significant that the housing industry has traditionally served as a leading indicator of economic recovery. In past recessions, this industry has preceded other industries out of recessions. When we compare the rate of change in the prime rate to the rate of change for housing (Slide 43), we see that there has existed a period of one year between the time that prime rate peaks and the time that the housing industry recovers. If this relationship continues in the future, we should expect that the demand for housing will bottom somewhere around August and that a slow turnaround will occur in the fourth quarter of 1982.

Note, however, even with this expected change that total housing demand in 1982 will not amount to more than 850,000 housing starts. One technique I use to determine whether this turnaround in housing is likely to occur is to track the change in the 1/12 curve relative to the change in the 12/12 curve (Slide 44). A 1/12 curve is the month's data divided by the data for the same month a year ago. The 1/12 curve is a leading indicator by about three months of what will happen in the 12/12 curve. As you can see, the 1/12 curve appears to have bottomed in January and looks as though it will cross the 12/12 curve in April. Naturally, for the 12/12 curve to flatten, the 1/12 curve must remain above it for several months.

What effect will these expected changes have on the asbestos-cement industry? To answer this question, let's first determine where the industry is relative to other segments of the economy (Slide 45). This graph tells us that the asbestos-cement industry, like the housing industry, has been in a negative growth posture since 1979. If the economic environment continues to deteriorate through August with a small recovery in the last quarter of 1982, shipments in the industry will be about 25% less than they were in 1981. You can see from this slide (Slide 46) that there is a 14-month lag between the peak in prime rate and the turnaround point for asbestos-cement. When we examine the relationship between housing and asbestos-cement, we notice that the lag is shorter than in our previous example. Note that the rate of change in housing demand and the rate of change in pipe demand are almost coincident (Slide 47) suggesting that the asbestos-cement industry will not recover until a recovery in housing occurs.

In summary, let me draw a few conclusions for you:

- (1) We see, using the leading, lagging and coincident indicator analysis that the economic system is not yet poised for a recovery. If it were, the economic brake and economic accelerator would have crossed recently suggesting that equilibrium had been reached and that recovery was imminent. This has not occurred. We may conclude, therefore, that the economic system is still deteriorating.
- (2) Using the components of Gross National Product as the basis for our analysis, we have found that the consumer segment of the economy is still in a positive growth mode. We have found that the investment segment and the export segment are both having a negative impact on Gross National Product. The composite picture drawn when all four components are viewed as a whole shows an economy poised to enter another recession.
- (3) We have seen that the relationship between housing and interest rates suggests that a turnaround in housing could occur in the fourth quarter and that housing starts could amount to 850,000 in 1982.
- (4) We have established a very close relationship between the demand for housing and the demand for asbestos-cement pipe and because of the relationship expect that the demand for asbestos-cement pipe in the United States in 1982 will be only 75% of the demand experienced by producers in 1981.

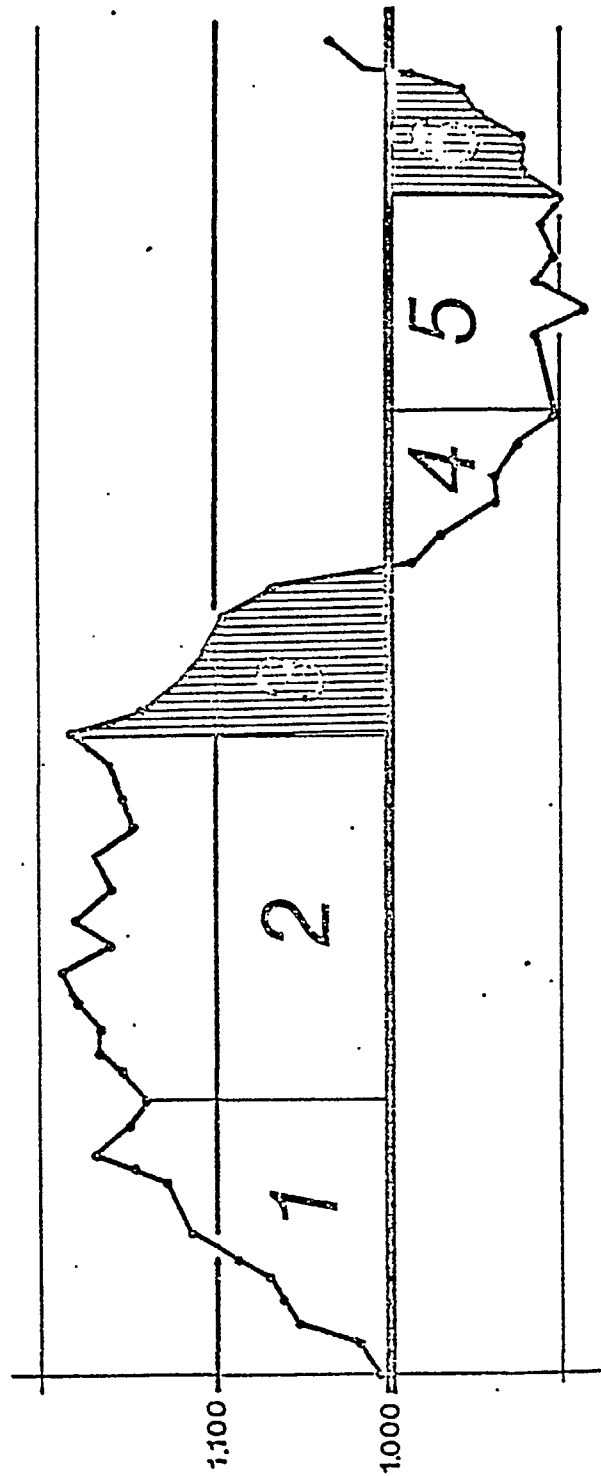
Economic Outlook U.S.

Rate of Change Curve

2

PRESSURE CURVE METHODOLOGY

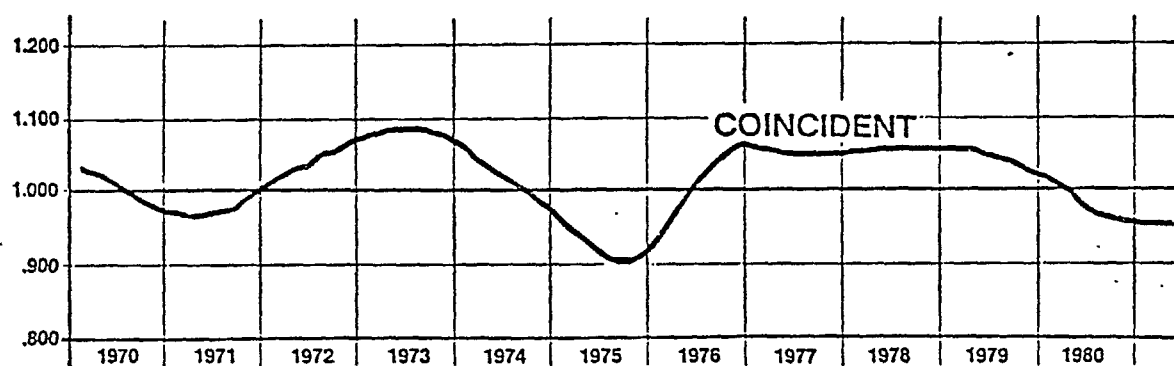
MONTHLY INTERVALS	1979: 4	0.094	NA	NA	
	1979: 5	0.971	NA	NA	
	1979: 6	0.977	NA	NA	
	1979: 7	0.971	NA	NA	Column 1: Raw Data
	1979: 8	0.966	NA	NA	
	1979: 9	0.967	NA	NA	
	1979:10	0.950	NA	NA	Column 2: 12 month moving total
	1979:11	0.935	NA	NA	
	1979:12	0.931	11.585	NA	
	1980: 1	0.922	11.522	NA	
	1980: 2	0.924	11.464	NA	
	1980: 3	0.916	11.403	NA	
	1980: 4	0.898	11.328	NA	
	1980: 5	0.891	11.248	NA	Column 3: Rate of change in 12 month moving tot
	1980: 6	0.906	11.178	NA	
	1980: 7	0.938	11.145	NA	
	1980: 8	0.956	11.135	NA	
	1980: 9	0.973	11.142	NA	
	1980:10	0.966	11.158	NA	
	1980:11	0.969	11.193	NA	
	1980:12	0.965	11.227	0.969	
	1981: 1	0.952	11.257	0.977	
	1981: 2	0.942	11.275	0.984	
	1981: 3	0.954	11.312	0.992	
	1981: 4	0.966	11.380	1.005	
	1981: 5	0.956	11.445	1.017	
	1981: 6	0.948	11.486	1.028	
	1981: 7	0.945	11.494	1.031	



COINCIDENT INDICATORS

- Non-farm employment
- Industrial Production Index
- Personal income less transfer payments
- Manufacturing and trade sales

TWELVE-MONTH RATE OF CHANGE IN THE COINCIDENT INDICATOR



LEADING INDICATORS

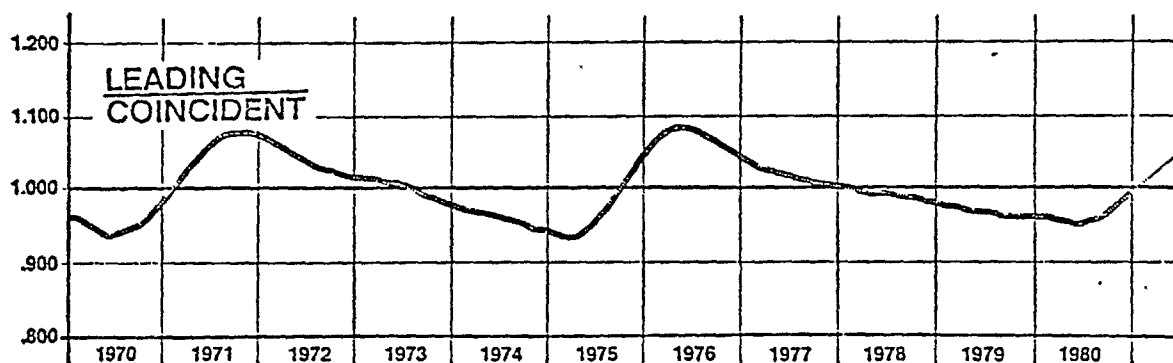
- Average manufacturing work week
- Manufacturing Layoff rate
- Manufacturers' new consumer goods orders
- Index of Net Business Formation
- Index of stock prices - 500 common S & P
- New plant and equipment orders
- Building permits
- Vendor delivery performance
- Inventory change
- Change in sensitive prices
- Change in total liquid assets
- Money supply

ECONOMIC ACCELERATOR

TWELVE-MONTH RATE OF CHANGE

$\left(\frac{\text{LEADING INDICATOR INDEX}}{\text{COINCIDENT INDICATOR INDEX}} \right)$

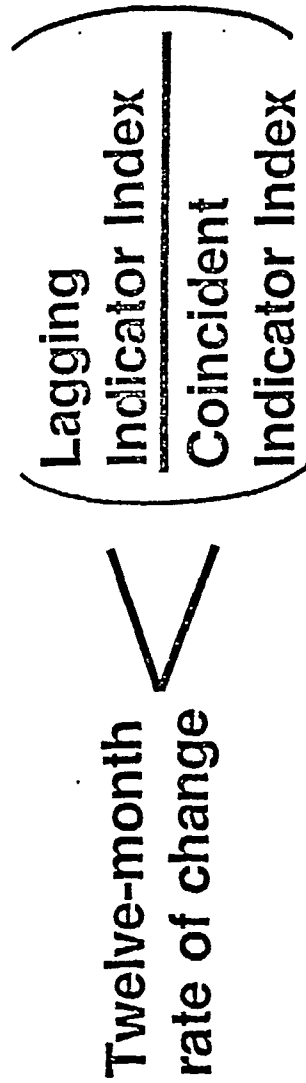
TWELVE MONTH RATE OF CHANGE CURVE IN THE
LAGGING INDICATOR INDEX/COINCIDENT INDEX



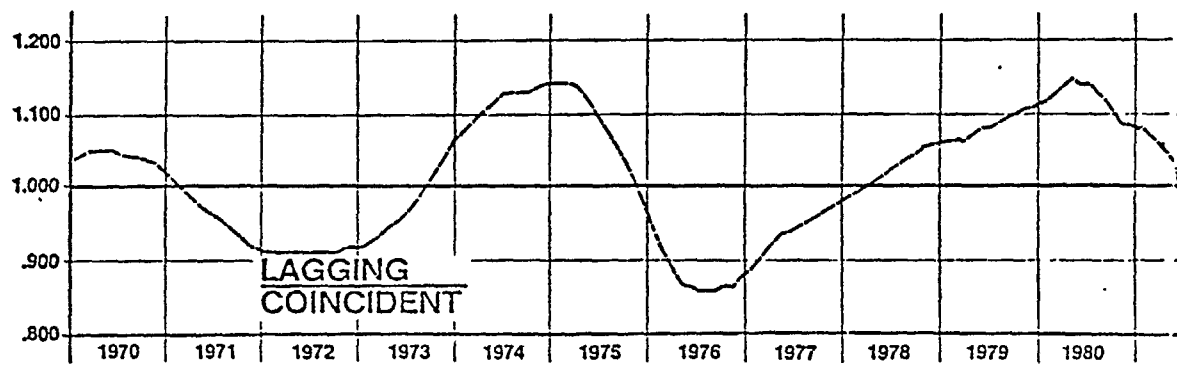
LAGGING INDICATORS

- Labor cost per unit of manufactured output
- Manufacturing and trade inventories
- Commercial and industrial loans outstanding
- Average duration of unemployment
- Ratio of consumer installment debt to disposable income
- Average prime rate

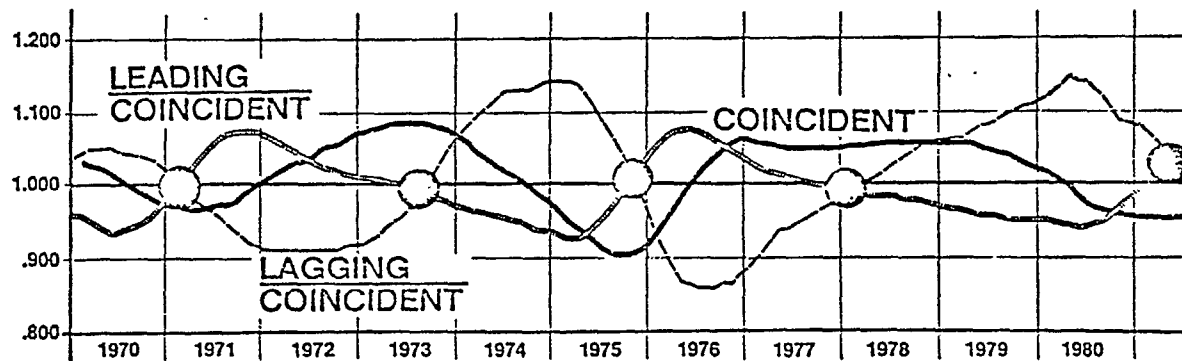
ECONOMIC BRAKE



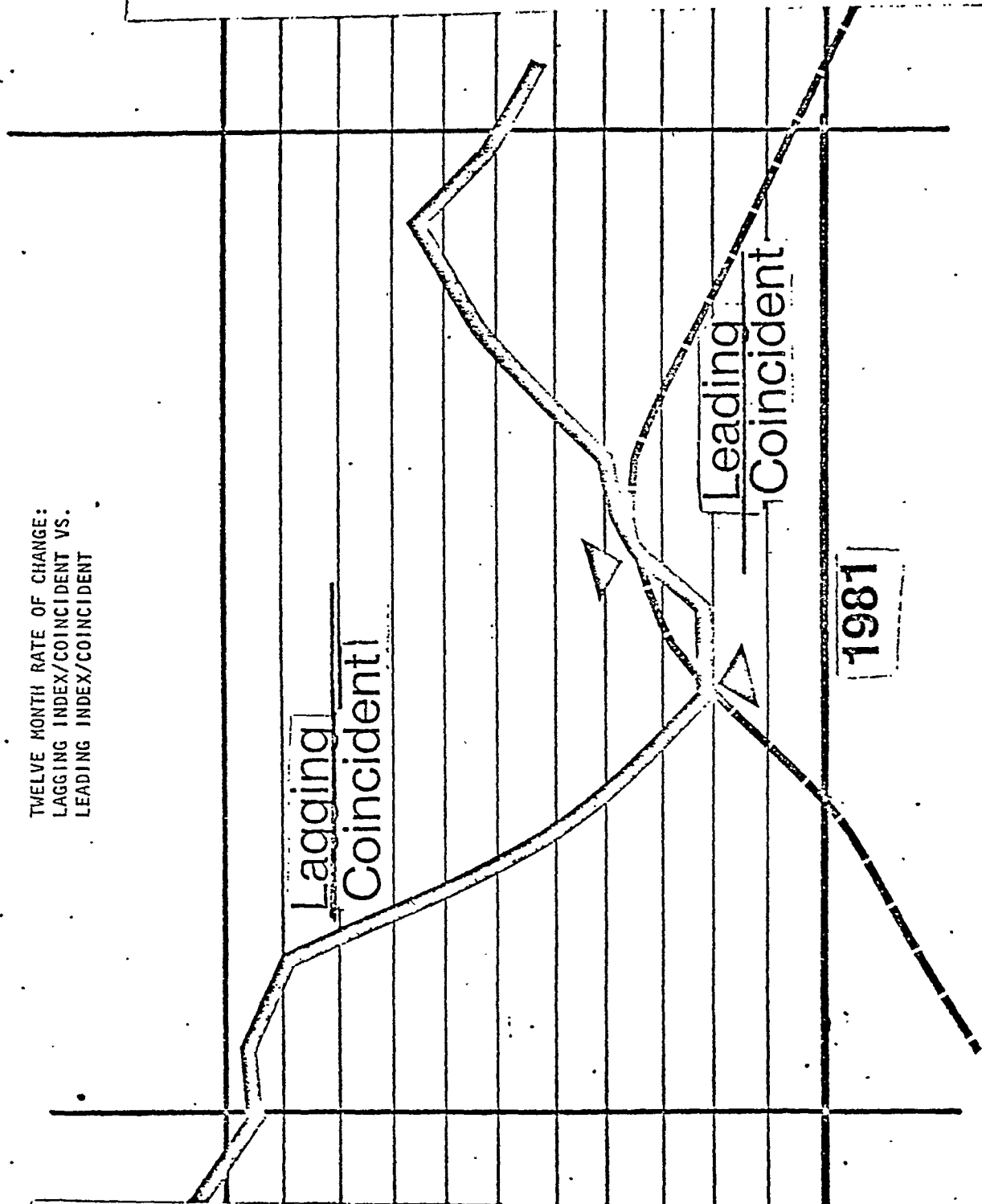
TWELVE MONTH RATE OF CHANGE CURVE IN THE
LAGGING INDICATOR INDEX/COINCIDENT INDEX



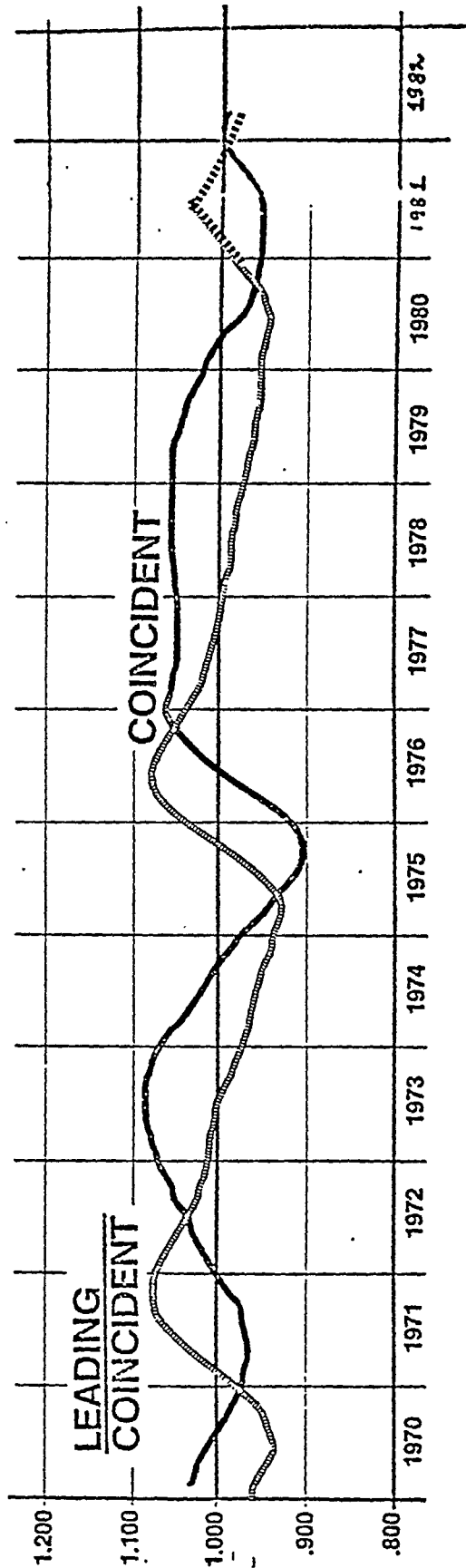
TWELVE MONTH RATE OF CHANGE IN LEADING INDEX/
COINCIDENT INDEX, COINCIDENT INDEX, LAGGING
INDEX/COINCIDENT INDEX



TWELVE MONTH RATE OF CHANGE:
LAGGING INDEX/COINCIDENT VS.
LEADING INDEX/COINCIDENT

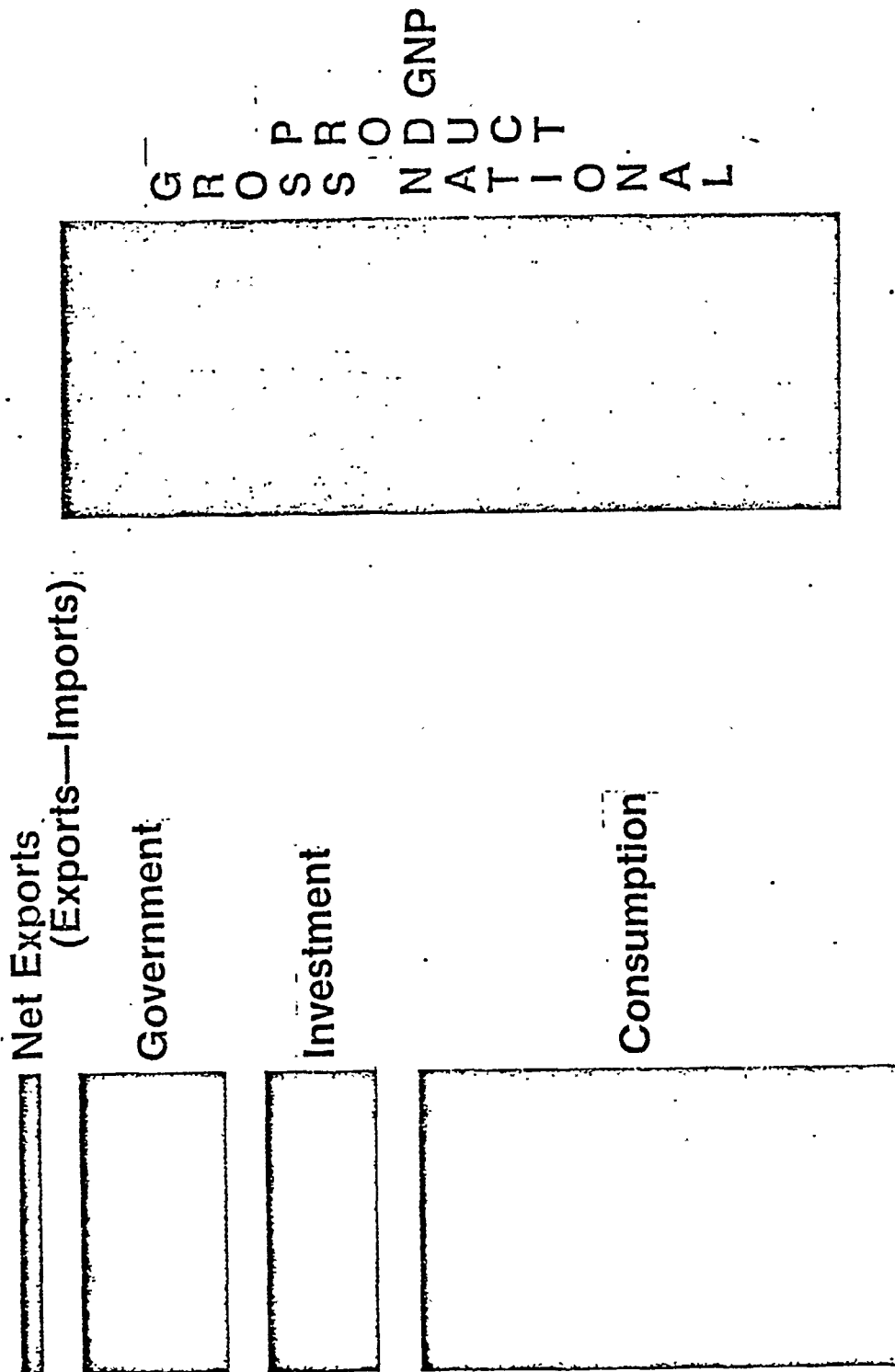


TWELVE MONTH RATE OF CHANGE IN THE LEADING INDICATOR INDEX/
COINCIDENT INDICATOR INDEX VS. COINCIDENT INDICATOR INDEX



SLIDE 15

Gross National Product



COMPONENTS OF
GROSS NATIONAL PRODUCT
1981

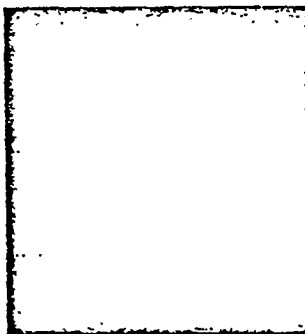
Personal Consumption Expenditures

CONSUMPTION



Consumption Expenditures

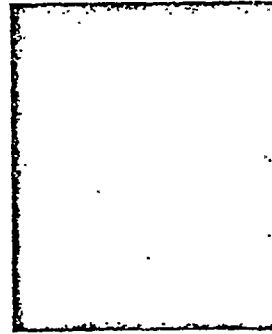
Services



Durable Goods

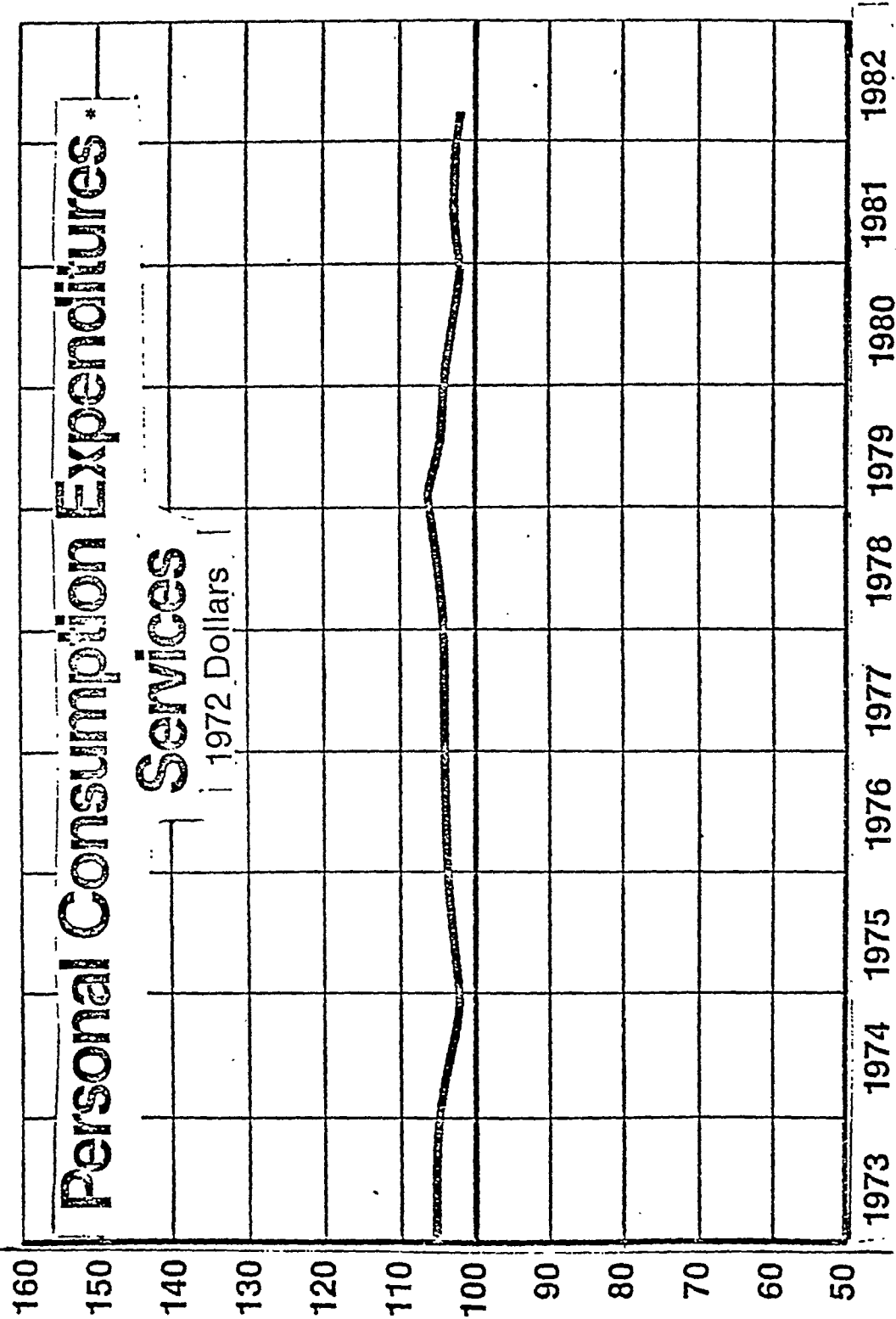


Non-Durable Goods

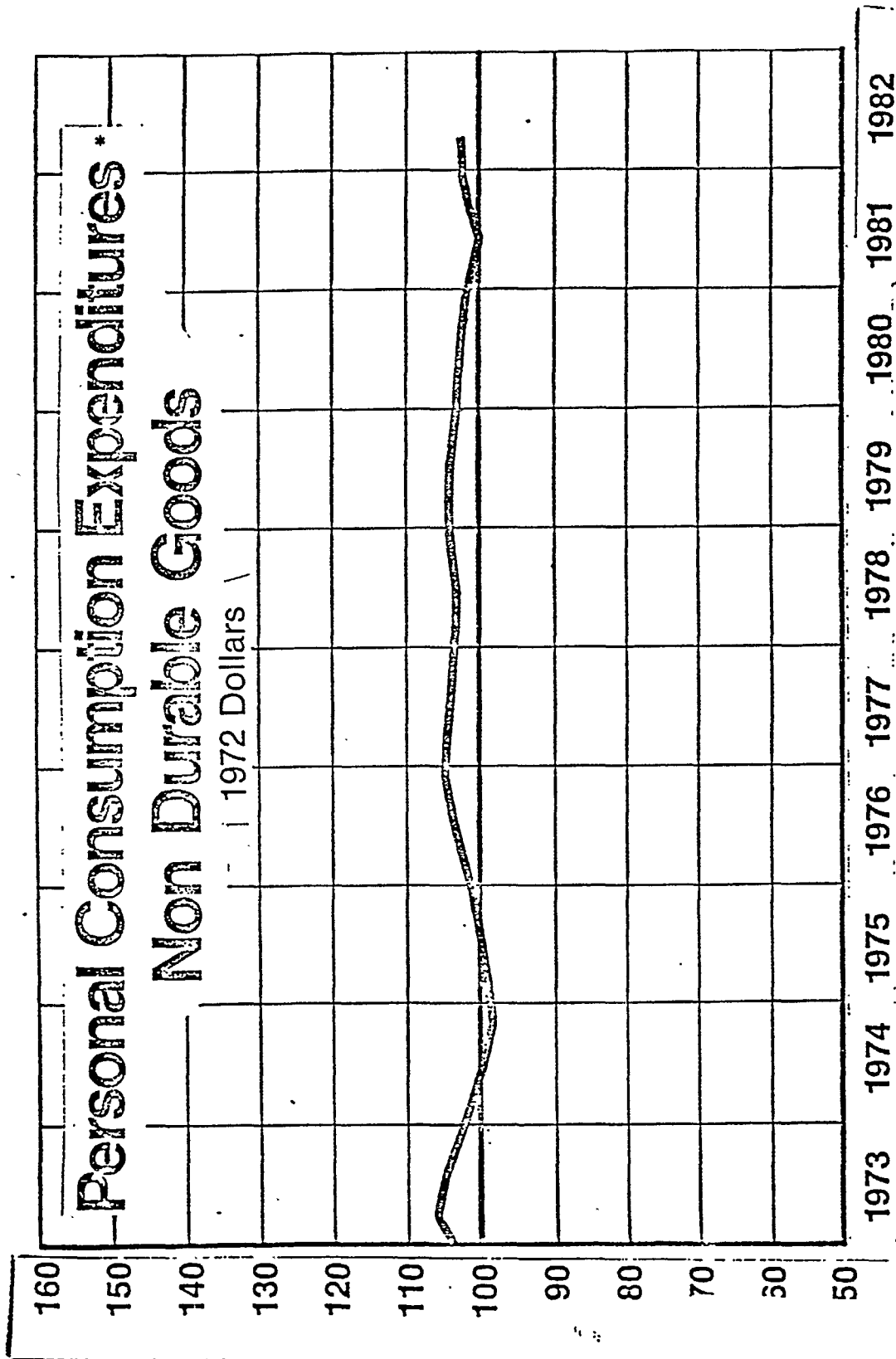


COMPONENTS OF CONSUMPTION

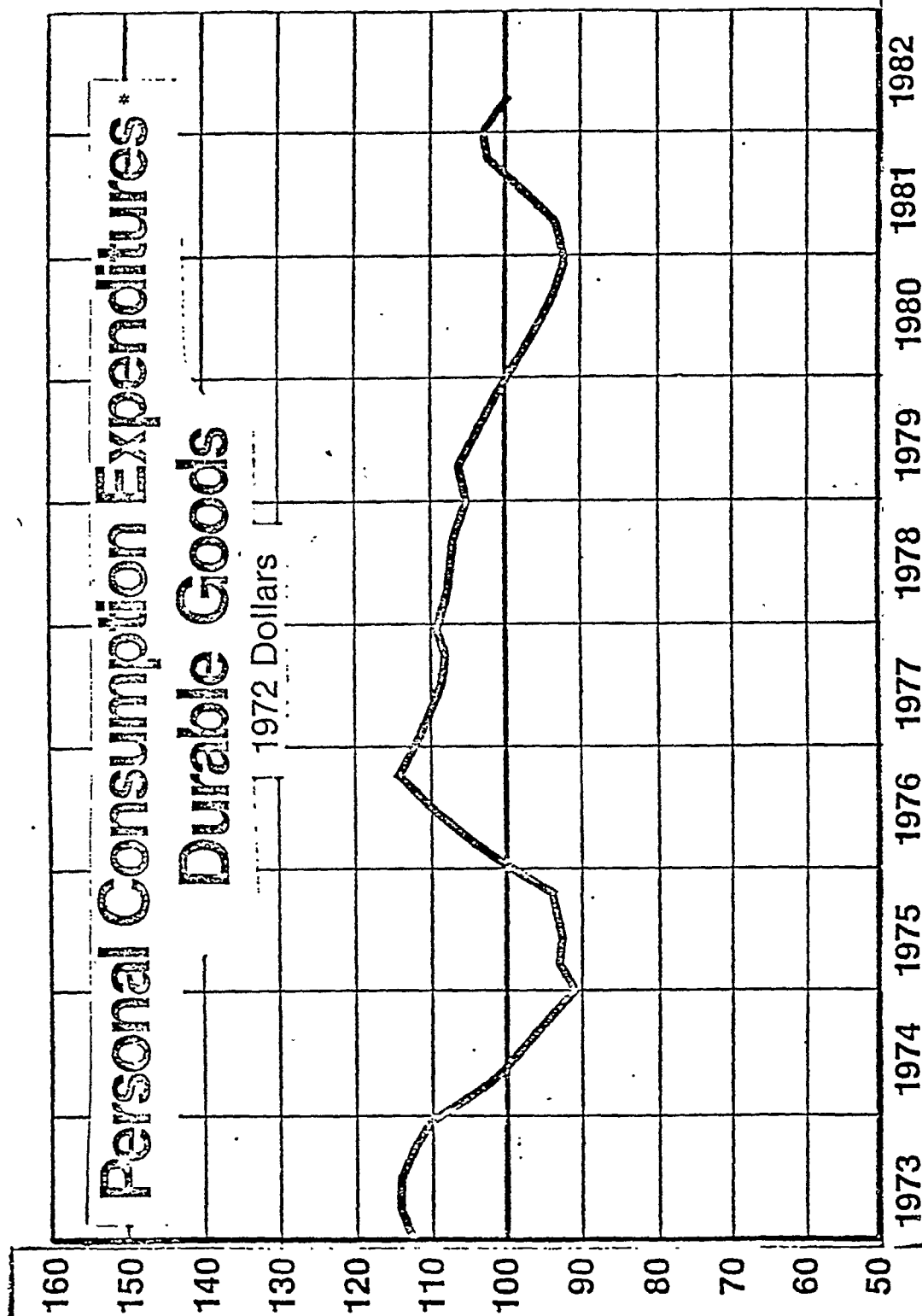
1981



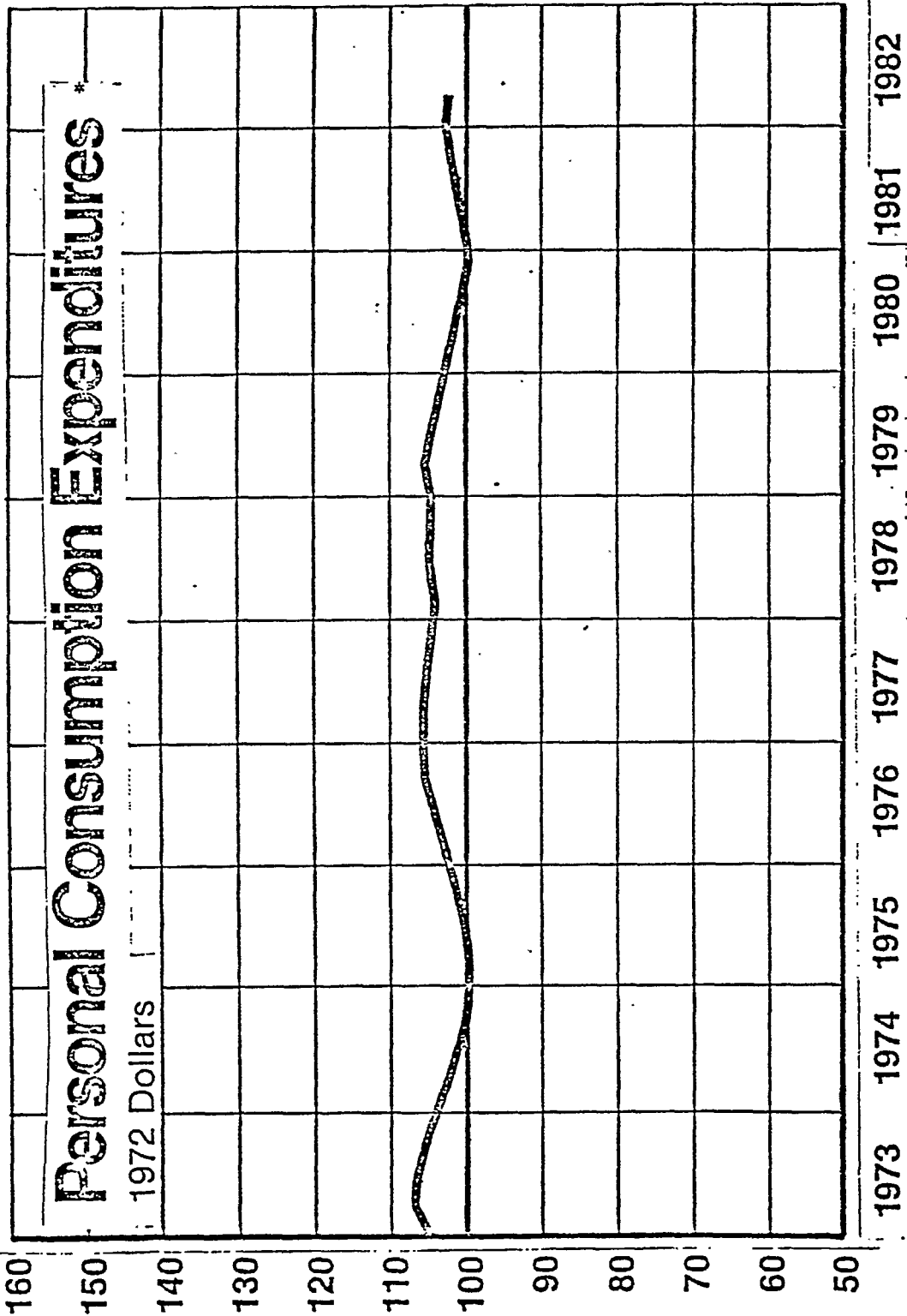
*TWELVE MONTH RATE OF CHANGE CURVE



*TWELVE MONTH RATE OF CHANGE CURVE



*TWELVE MONTH RATE OF CHANGE CURVE



*TWELVE MONTH RATE OF CHANGE CURVE

Gross Private Domestic Investment

Change in
BUSINESS INV.

RESIDENTIAL

NON-
RESIDENTIAL

DURABLES
PRODUCERS

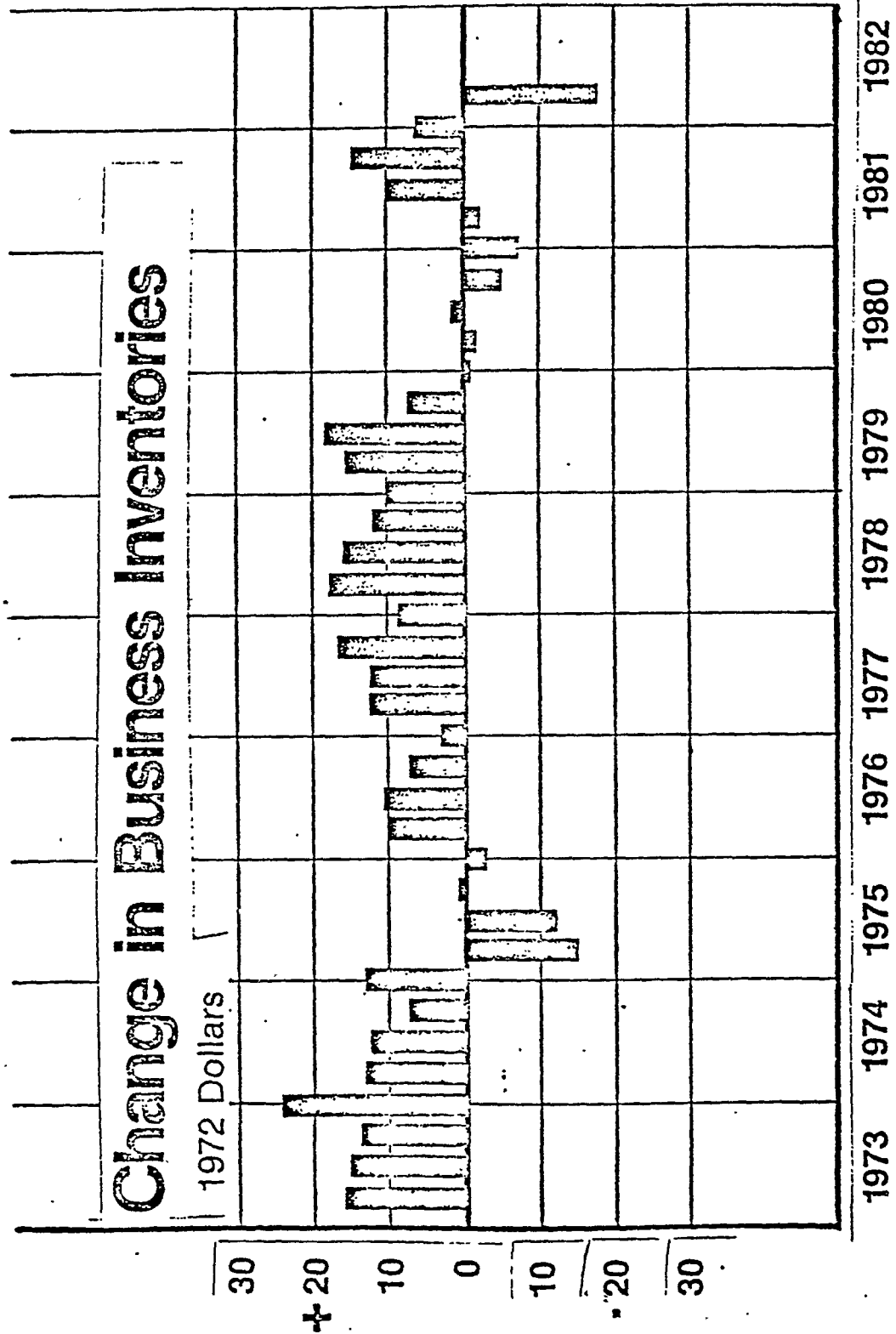
CONSTRUCTION

GROSS
PRIVATE
DOMESTIC
INVESTMENT

COMPONENTS OF GROSS DOMESTIC
PRIVATE INVESTMENT

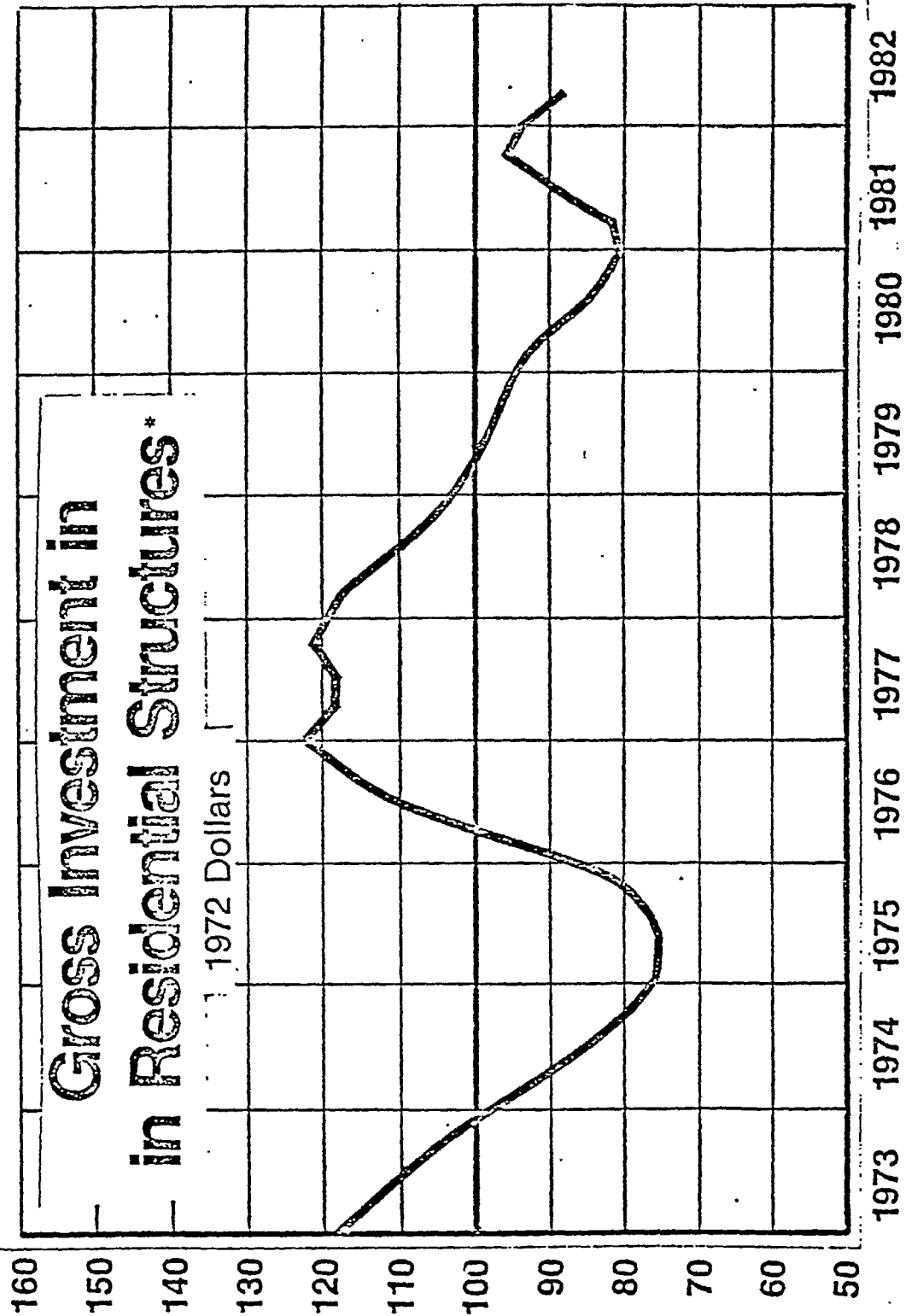
1981

SLIDE 25

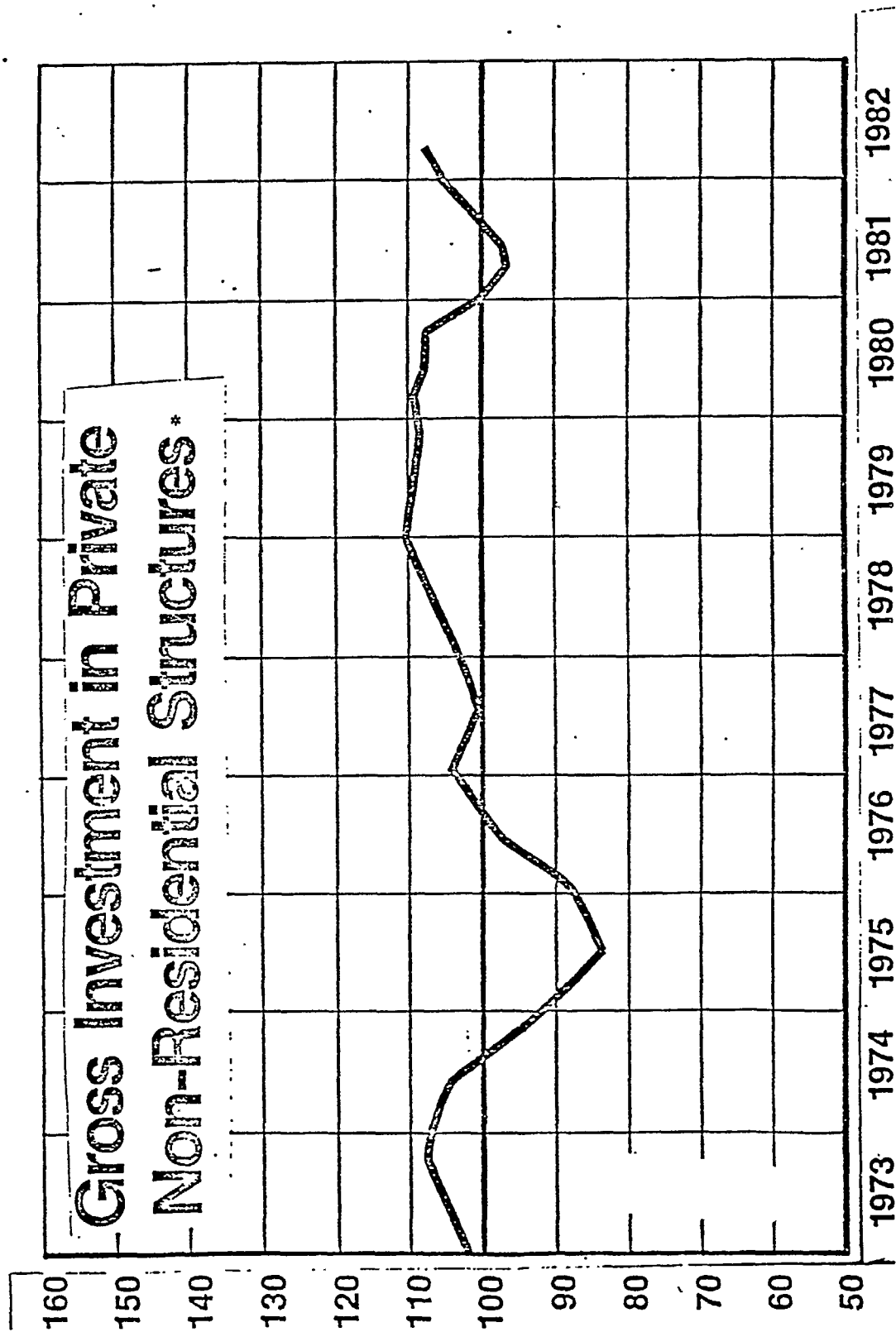


Gross Investment in in Residential Structures*

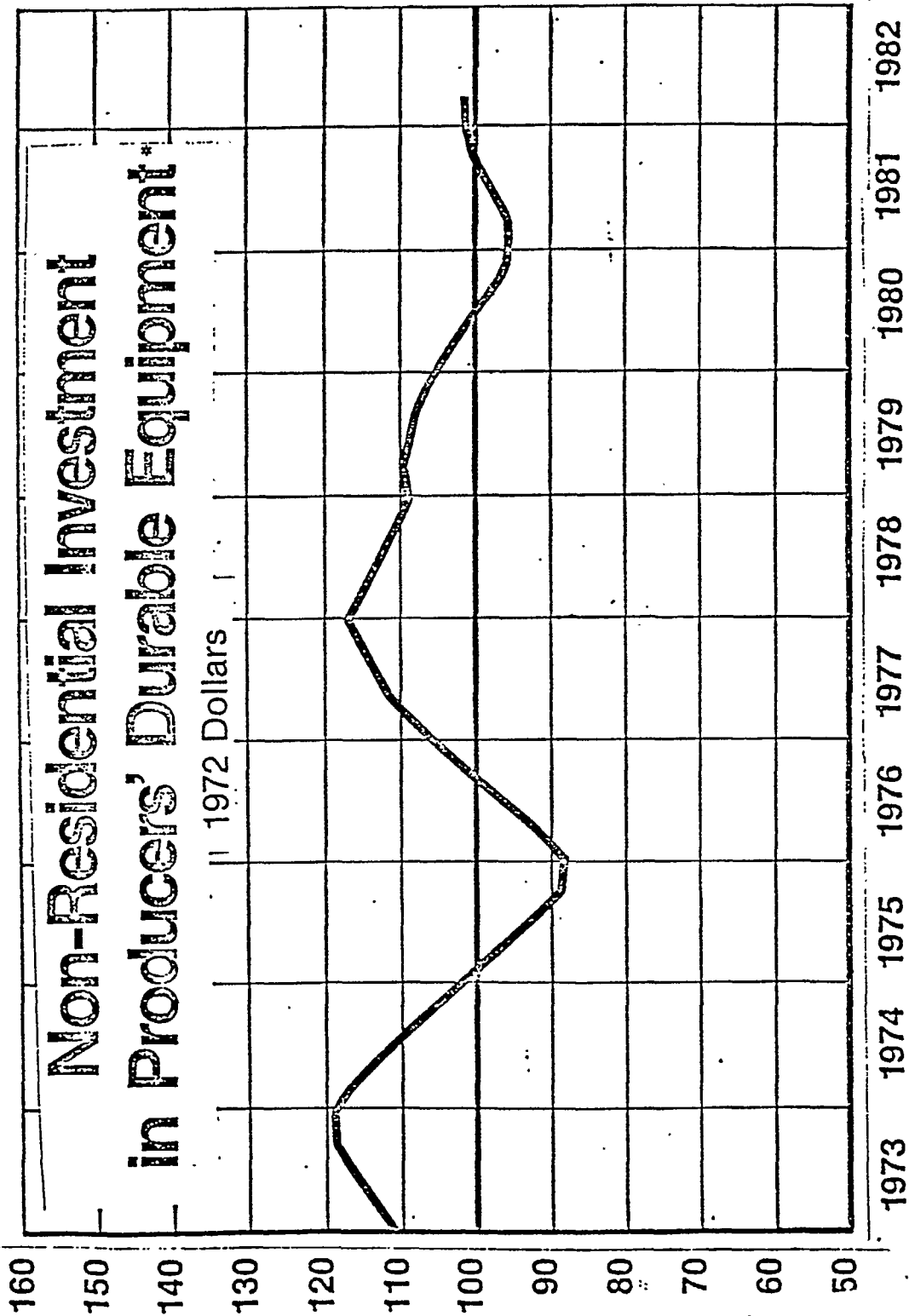
1972 Dollars



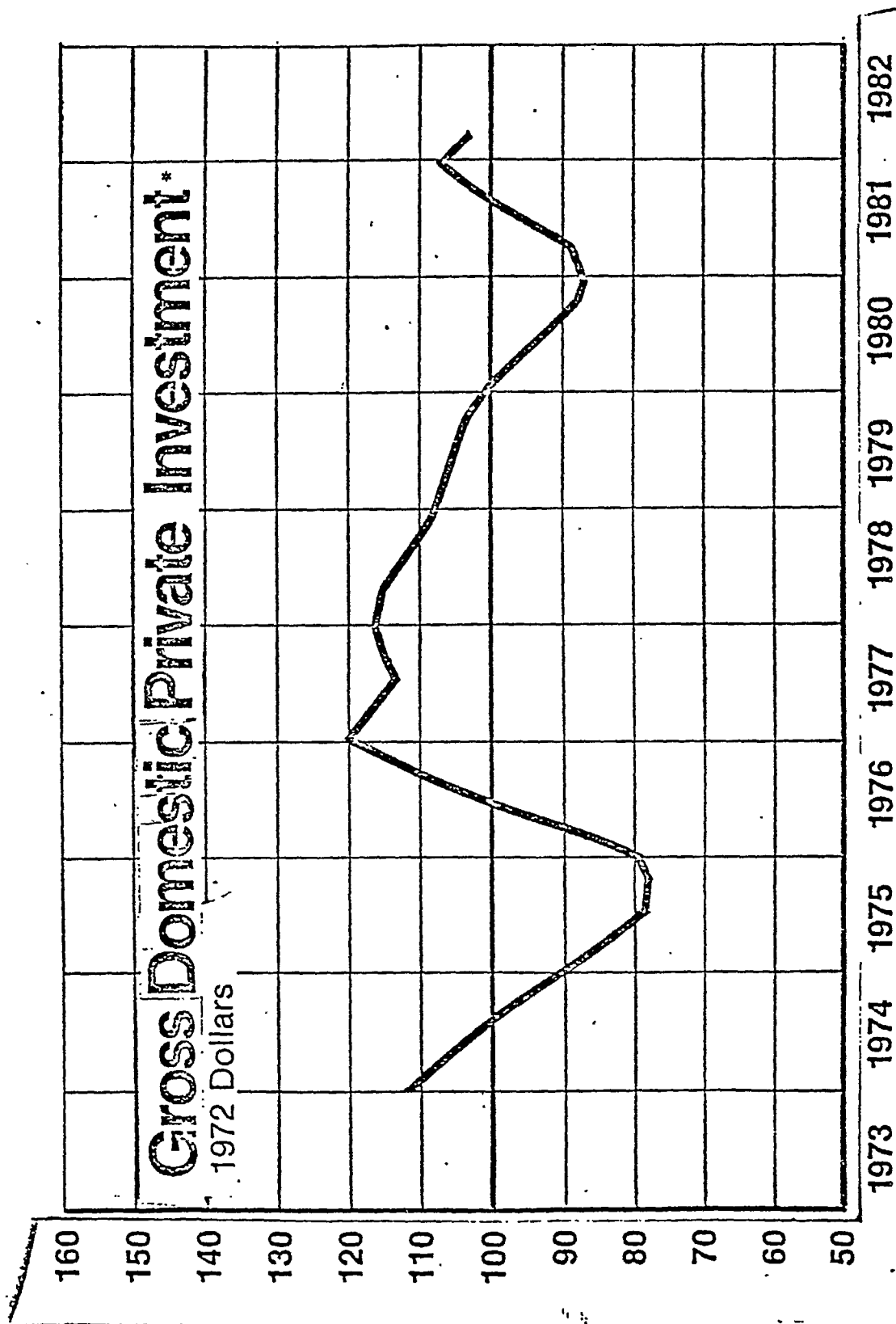
*TWELVE MONTH RATE OF CHANGE CURVE



*TWELVE MONTH RATE OF CHANGE CURVE

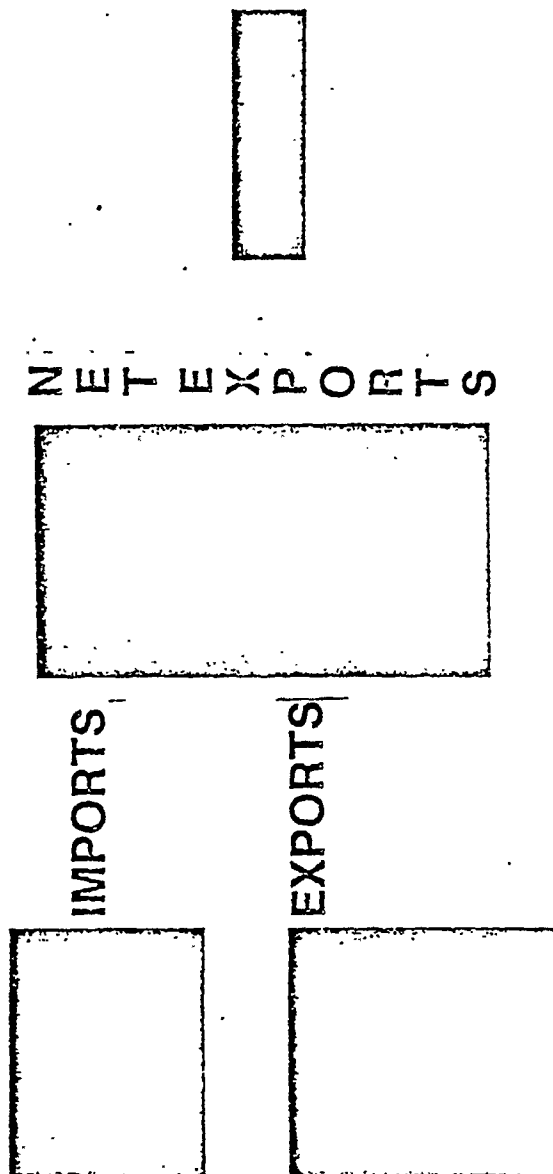


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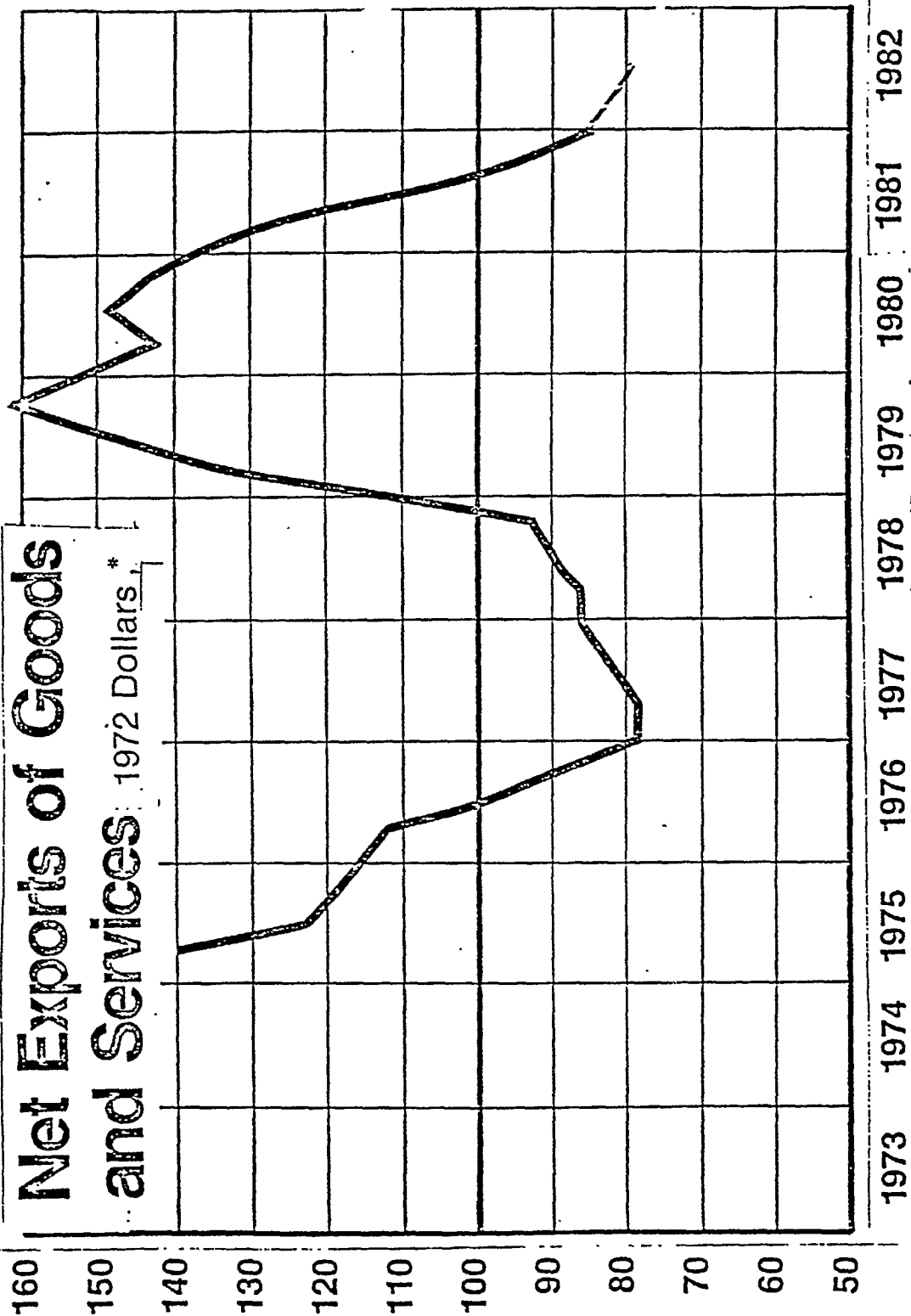


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Not Exports

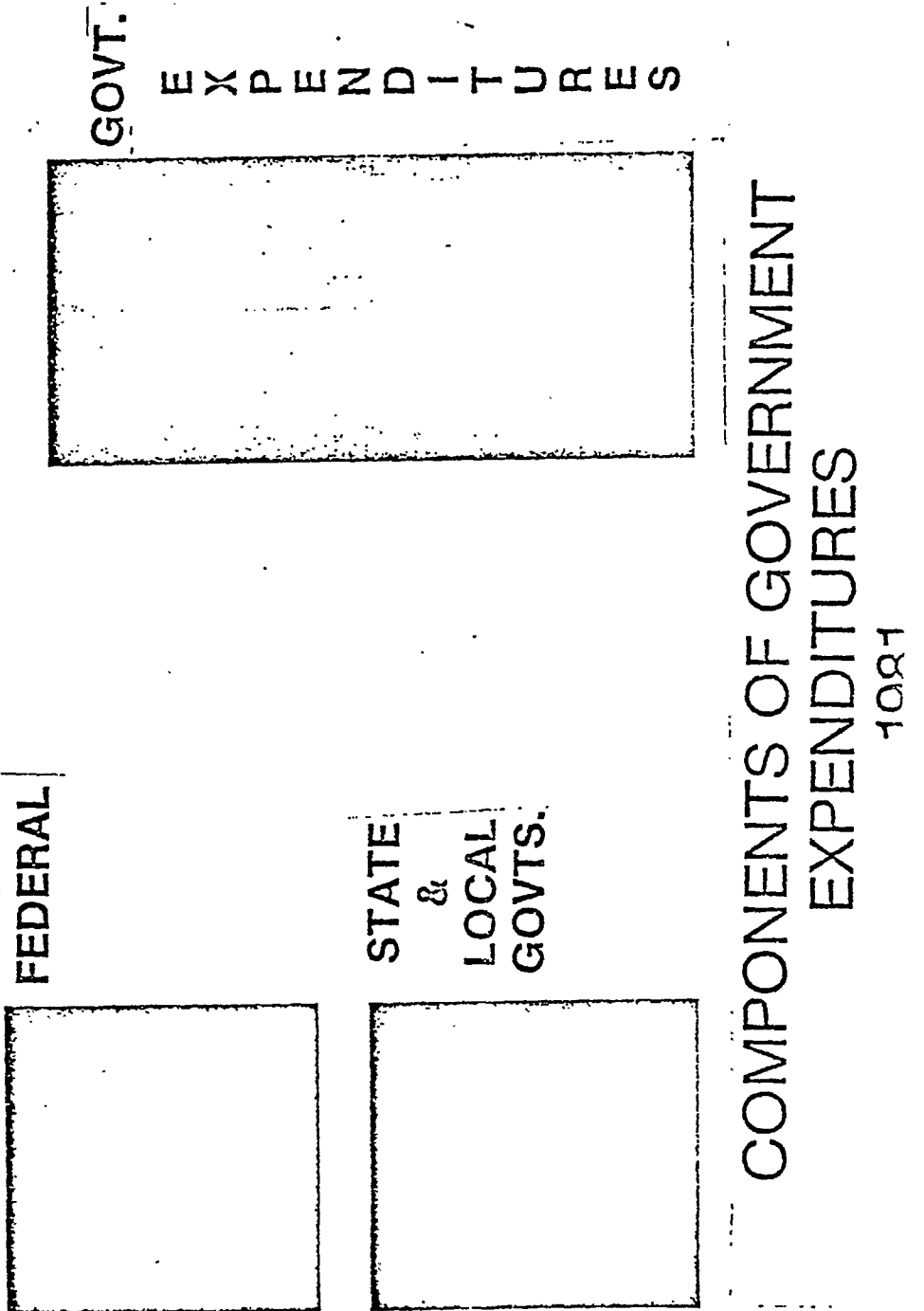


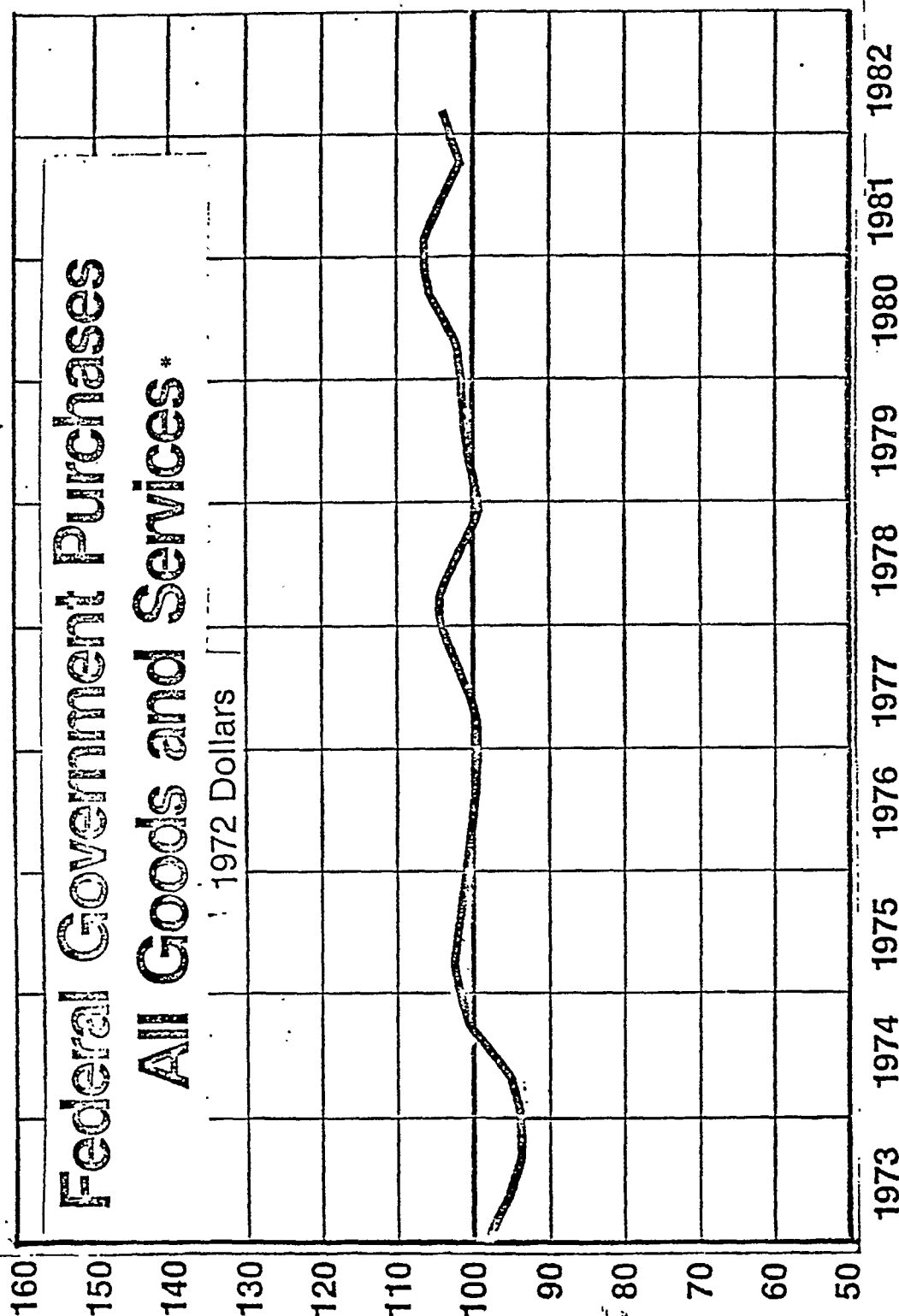
COMPONENTS OF NET EXPORTS
1981



*TWELVE MONTH RATE OF CHANGE CURVE

Government

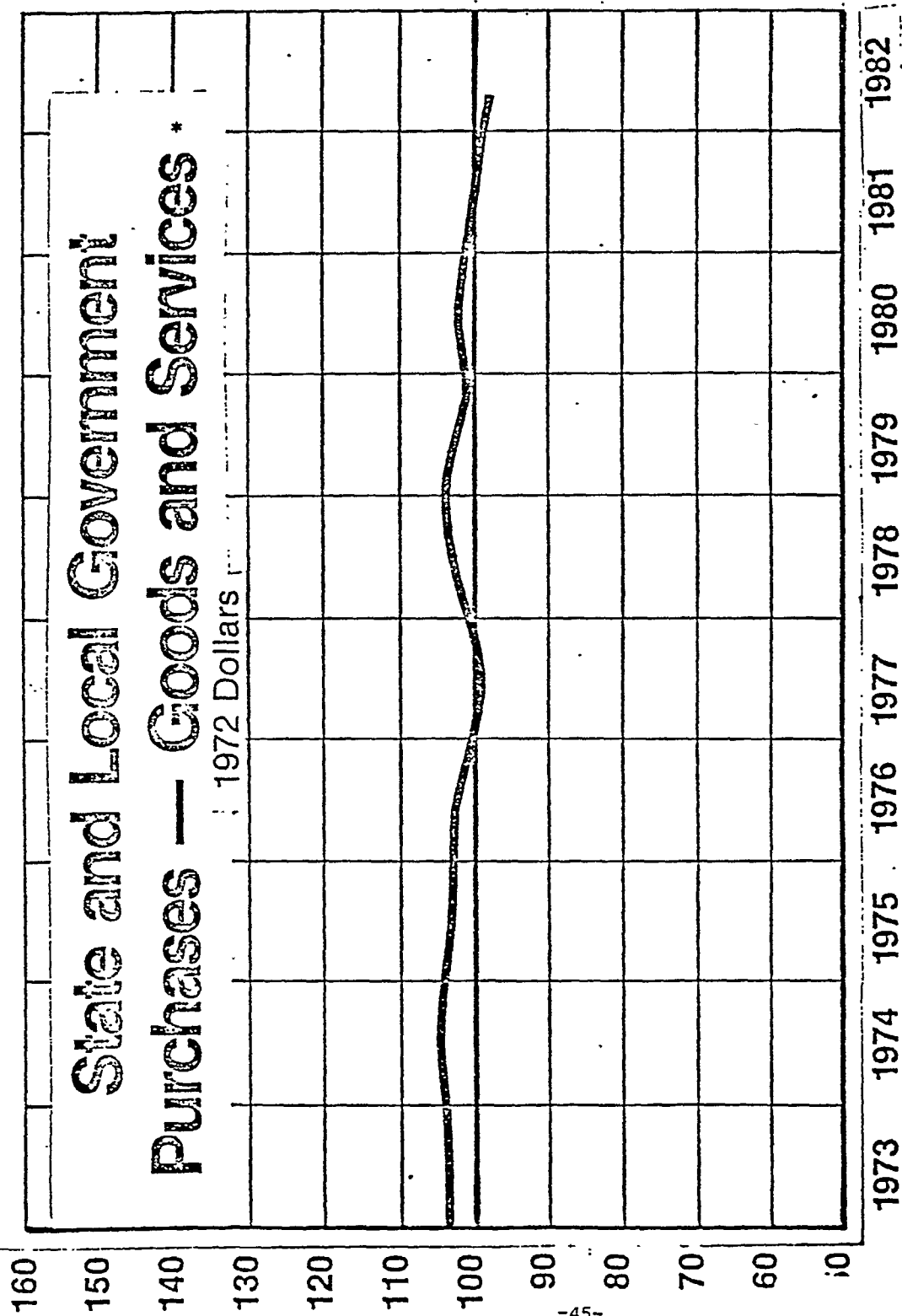




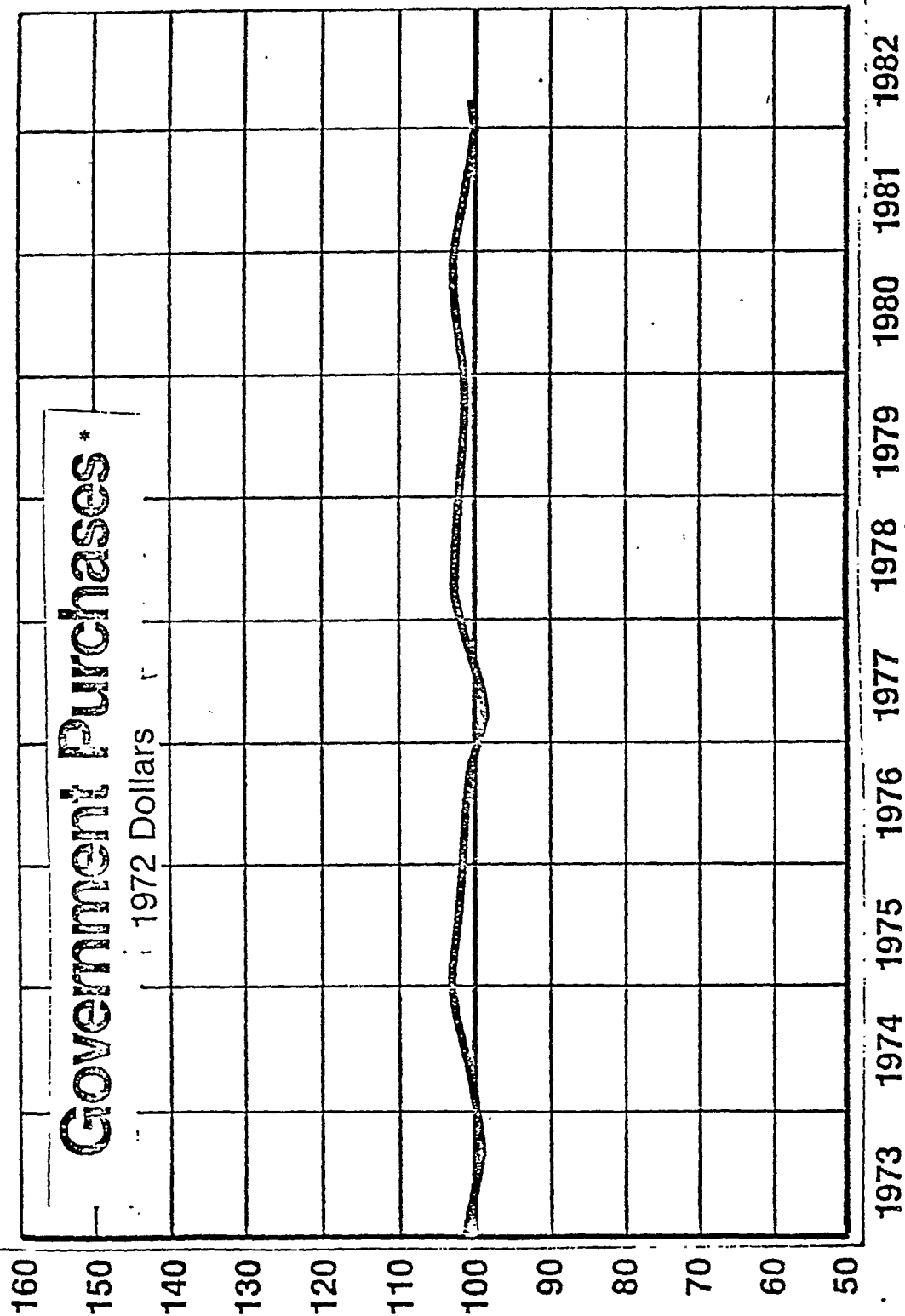
TWELVE MONTH RATE OF CHANGE CURVE

State and Local Government Purchases — Goods and Services *

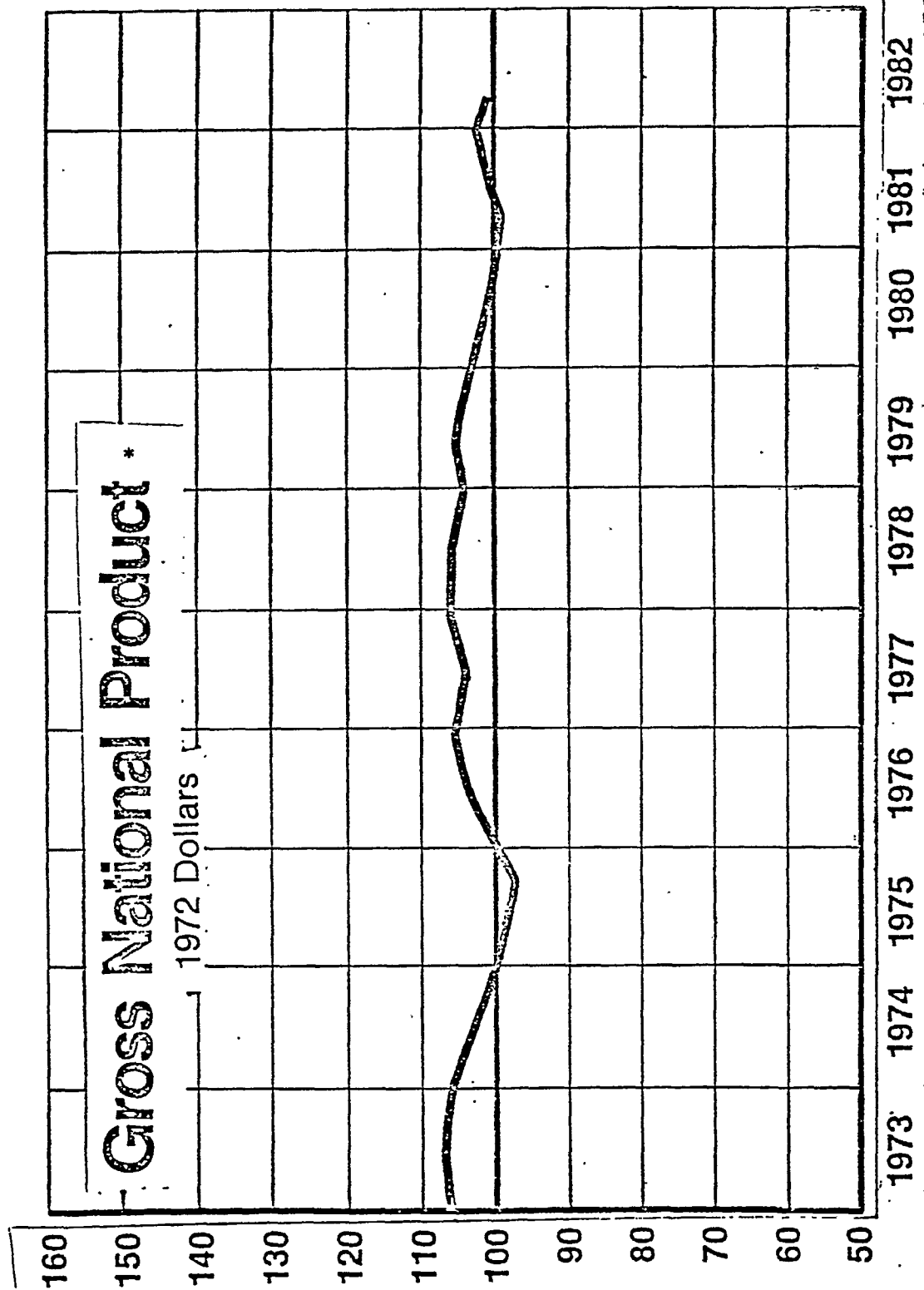
1972 Dollars



*TWELVE MONTH RATE OF CHANGE CURVE

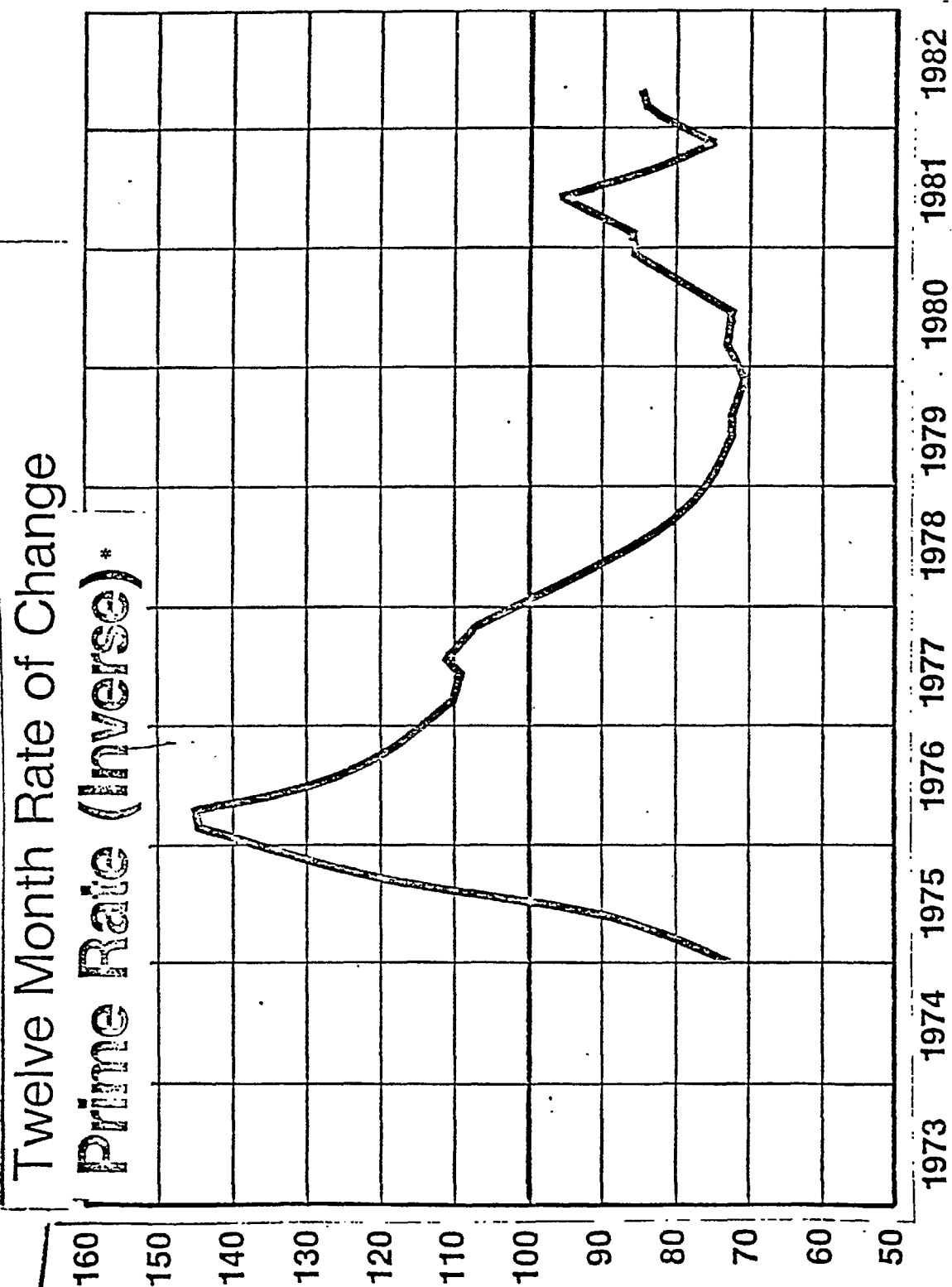


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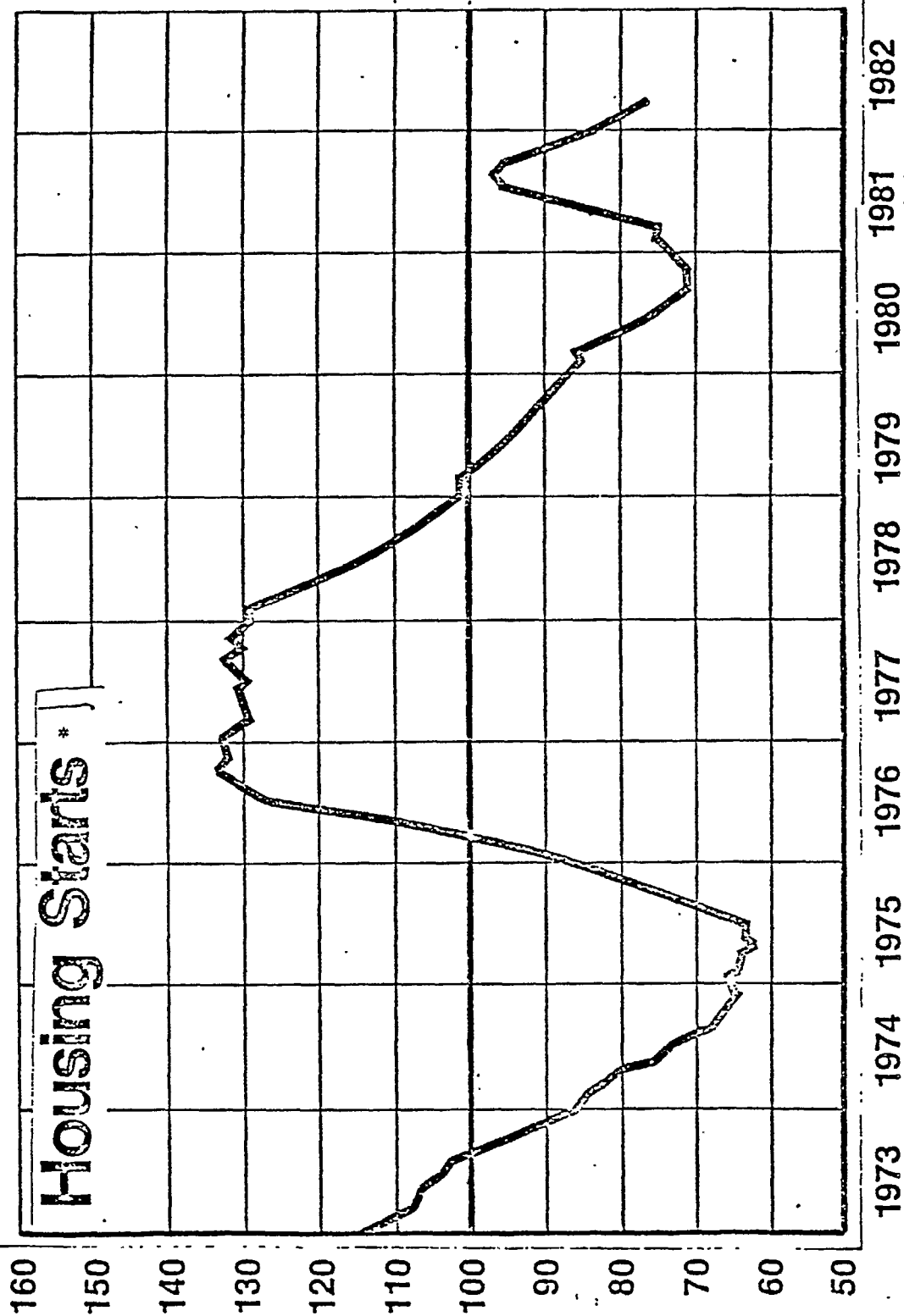


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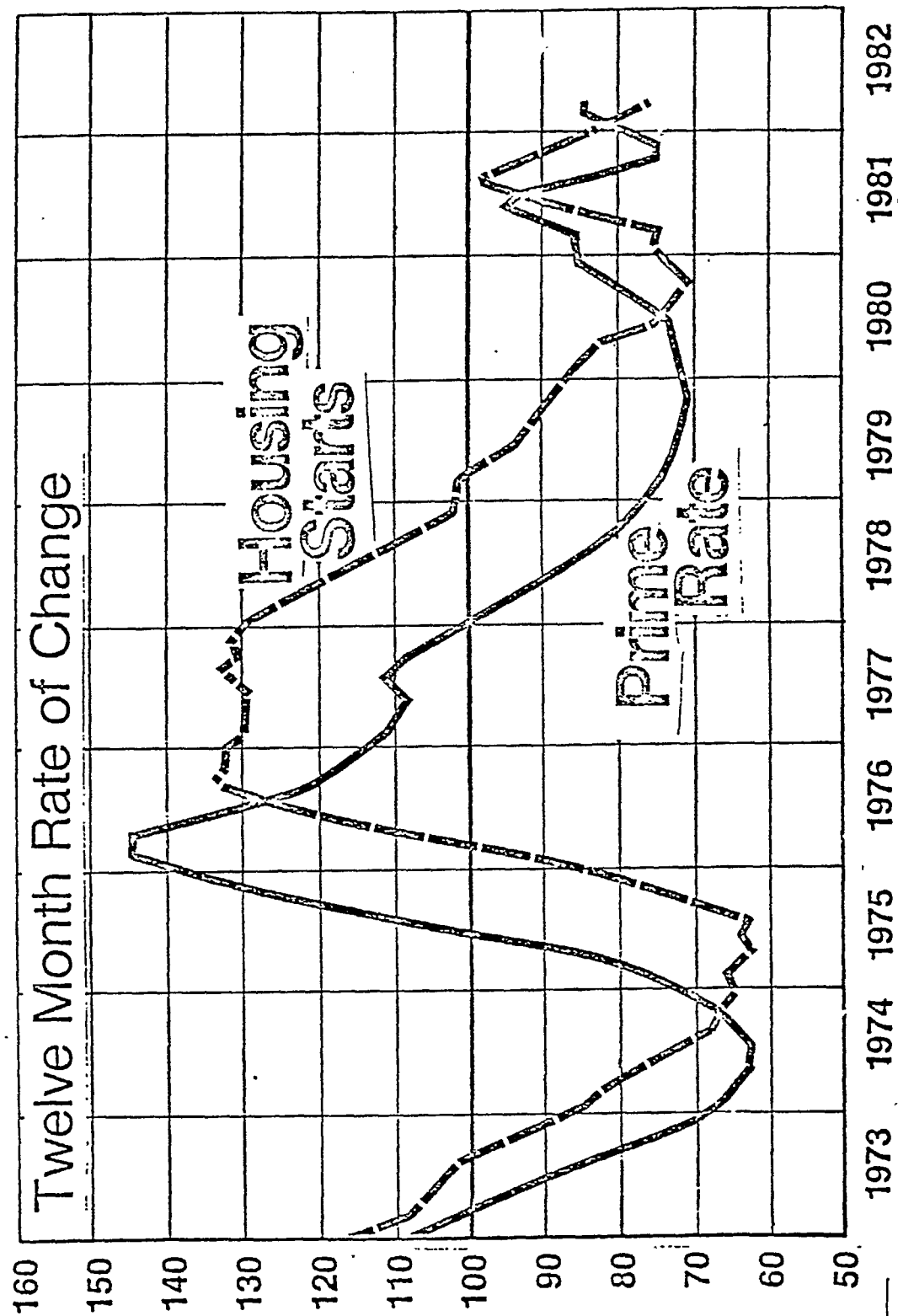
Prime Rate

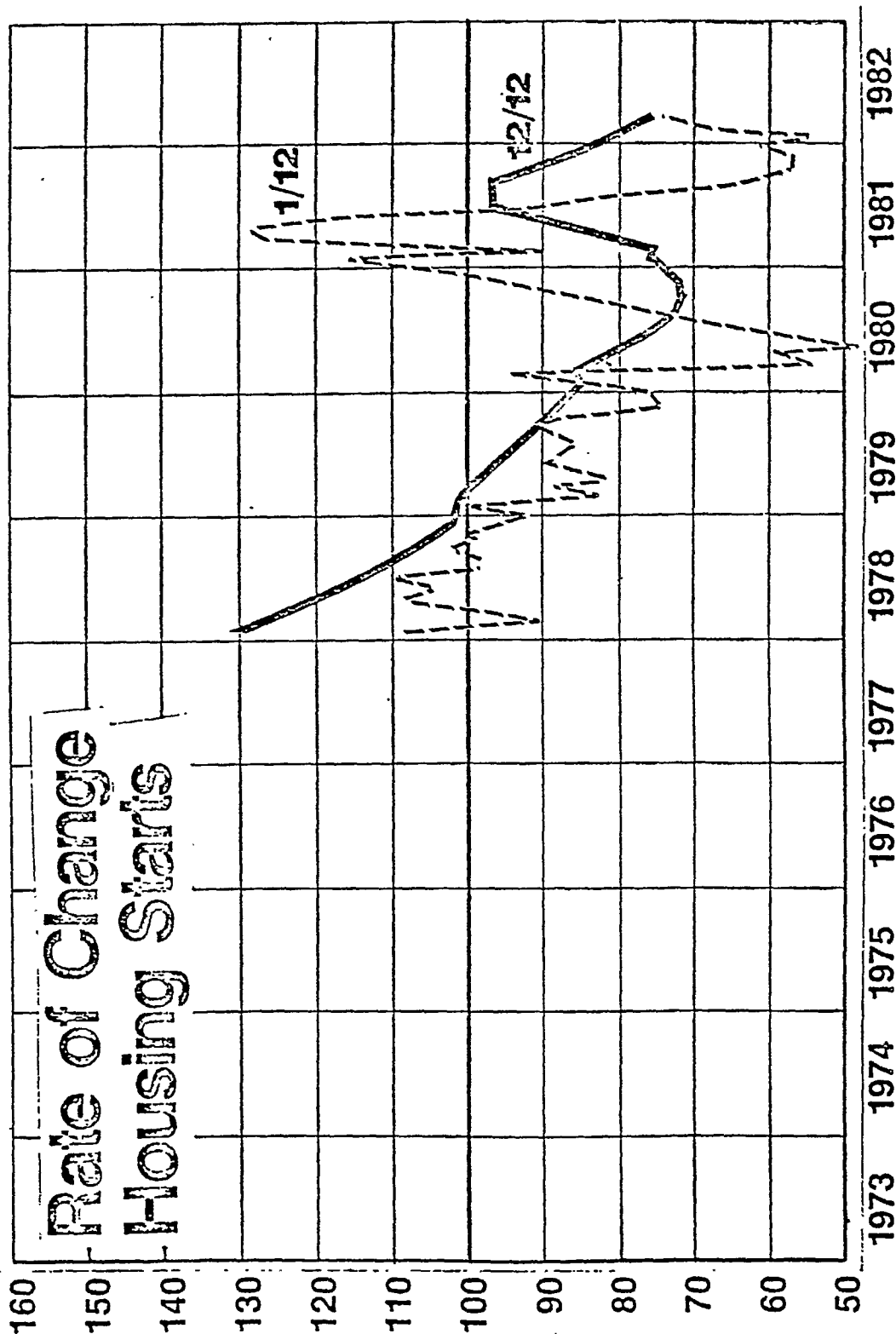


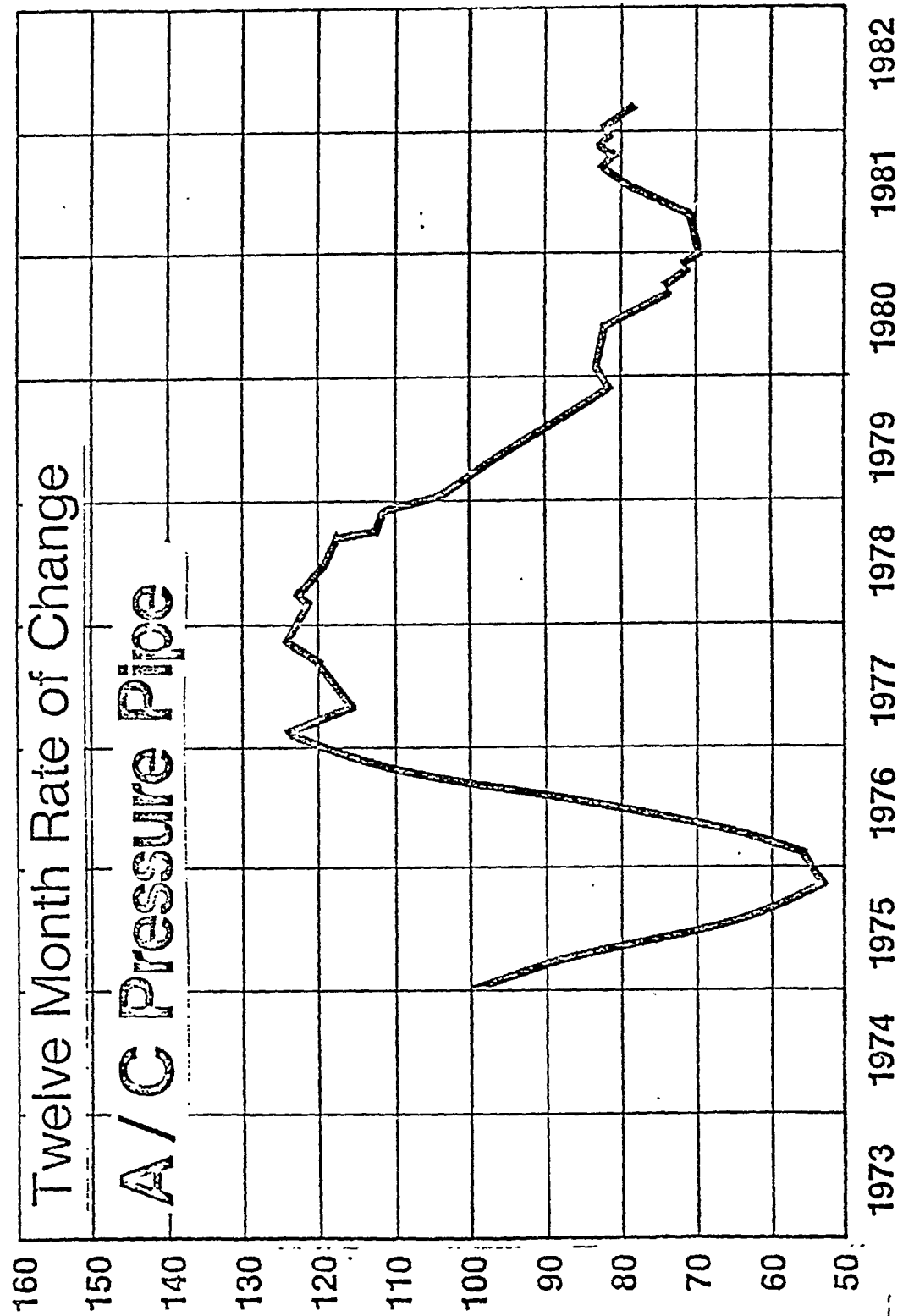
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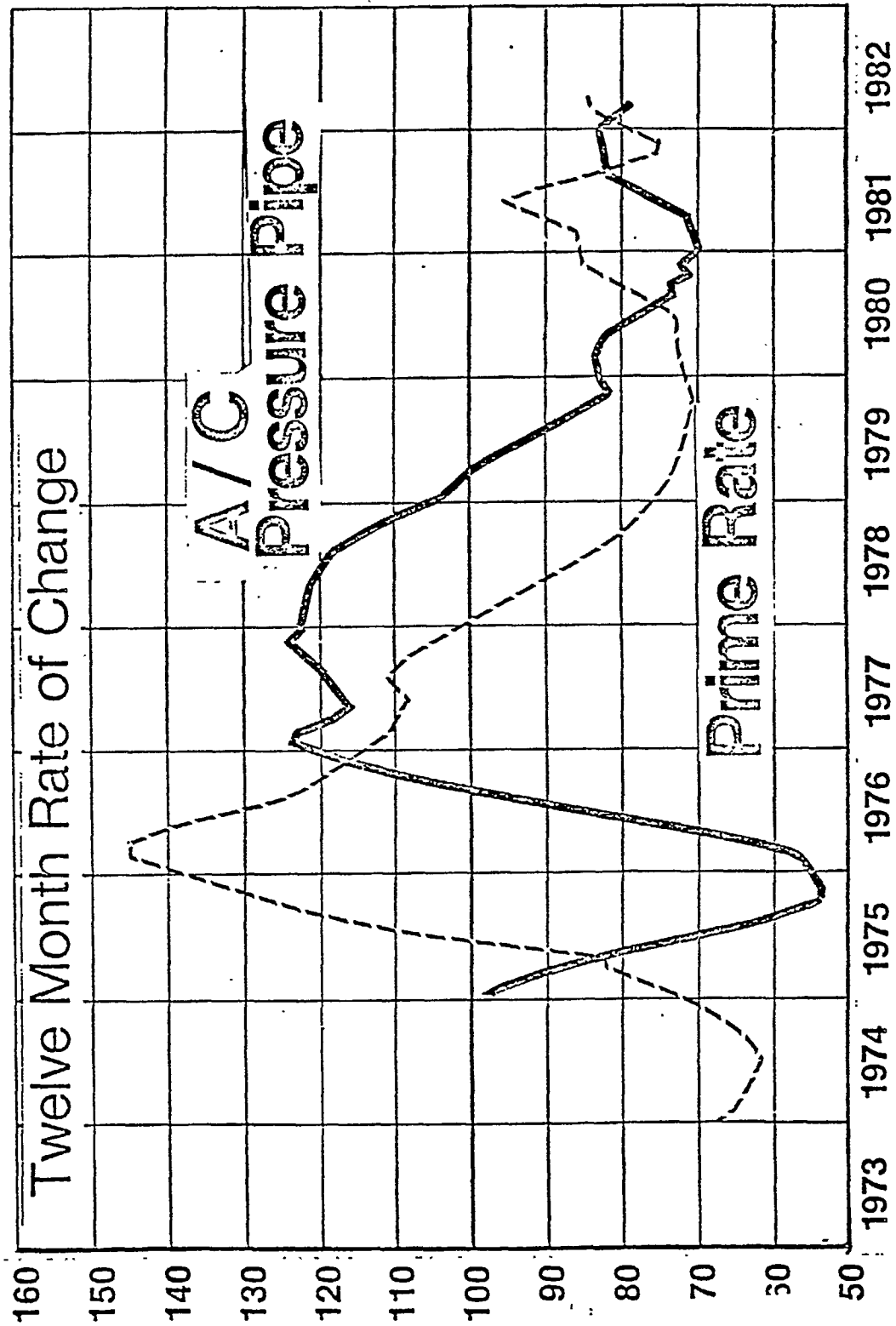


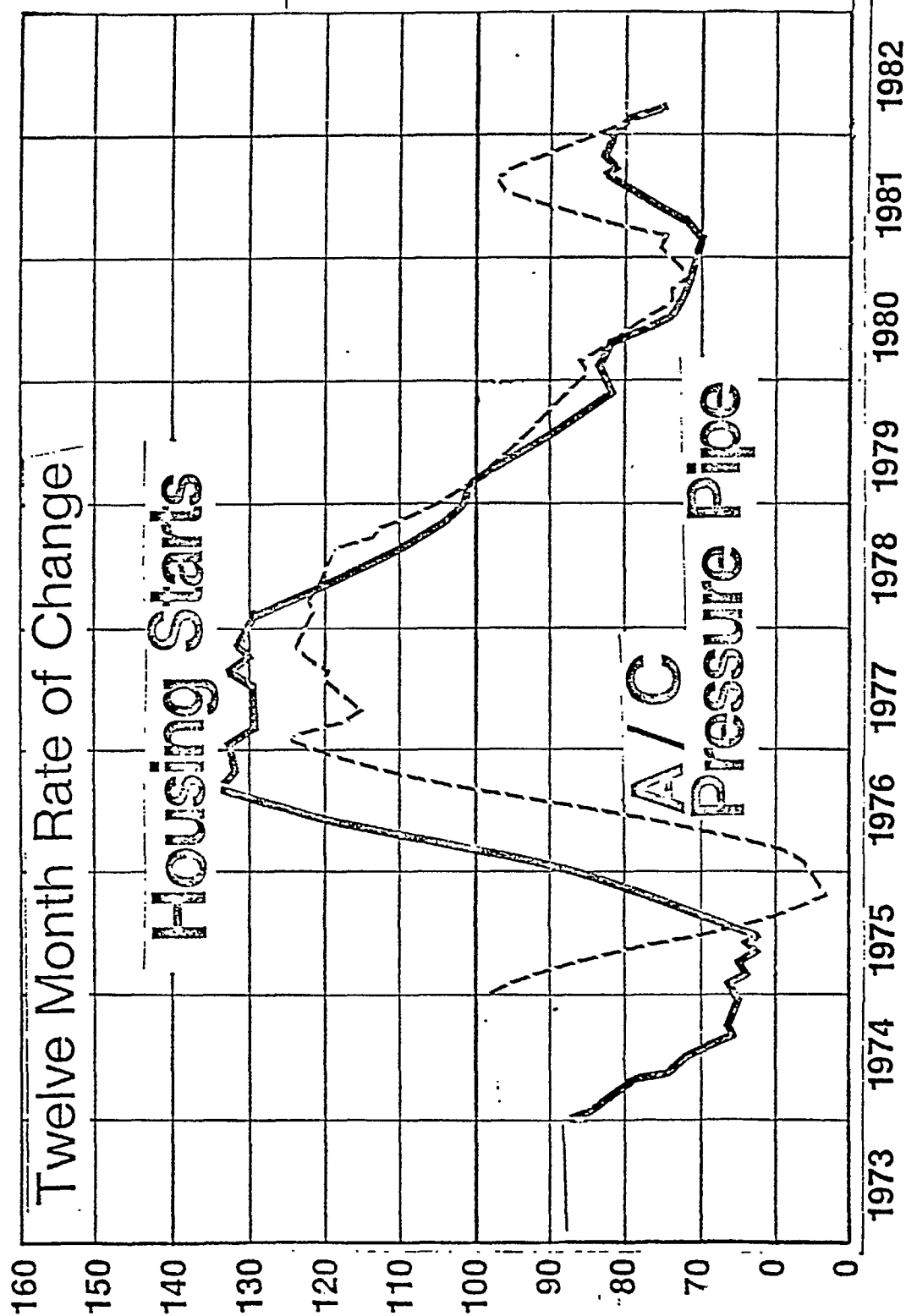
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MARKET OUTLOOK: U.S.
by
John L. Fischer
Vice President & General Manager
Pipe Division
Johns-Manville Corporation

Good morning. It's a pleasure to be here in Cancun with so many of the A/C pipe industry people that we met last year in Palm Springs. I've been looking forward to this week for some time. It will give me the opportunity to both renew those Palm Springs acquaintances and meet others from the industry who did not attend last year's Conference. Because of the many challenges facing our industry today, the free exchange of ideas that this meeting should generate is extremely important.

It is somewhat ironic that our Association selected a person with only one year of recent pipe experience to talk to you today about the U.S. pipe markets. Considering the kind of year it has been, you must realize that I have a different perspective of the pipe business in general.

As we take a look today at the pipe markets in the United States, and in particular the asbestos-cement pipe markets, I think it would be helpful to thread a little industry history through our talk and point out factors that have had a strong influence on the business. As I see it, these factors are:

1. The U.S. asbestos-cement pipe business has been primarily associated with the water and sewer pipe markets.
2. Disregarding economic swings, there has been no real growth in these two pipe markets in recent years.
3. The business segments have been very regional in nature.
 - A. A/C sewer pipe sales and acceptance are strong in the northeastern quadrant of the country.
 - B. There are no appreciable sewer pipe sales in the southern half of the country.
 - C. Acceptance and sales of asbestos-cement water pipe are strong in the west and southwest.
4. New cost competitive products have been introduced and have gained considerable market acceptance.
5. Along with the new products, a considerable amount of new pipe producing capacity has come on-stream.
6. Pipe supply far exceeds demand. High interest rates resulted in a decrease in construction. This factor is further complicated by a depressed economy and reduced government spending.
7. The combination of poor economic conditions and excess industry capacity has resulted in eroded prices and earnings through the entire U.S. piping industry. As a result, asbestos-cement, PVC, cast iron and clay pipe plants have been closed throughout the country, and further closings are anticipated in the near future.
8. The asbestos and health issue has and will have a detrimental effect on asbestos-cement sales. This is particularly true in areas where substitute products have received good acceptance.

Let's look at the industry in depth. This chart shows U.S. government data on the pipe industry's total shipments into the water and sewer markets. The major products tracked in the water works include A/C, ductile iron and plastic. In the sewer market, A/C, clay and PVC are the products having major acceptance. You can see that there are no apparent growth patterns in these curves. The sewer market is particularly flat. Of course, you have to remember that these curves reflect the total U.S. picture. In reality, the southern or sunbelt areas of the country have market growth potential, whereas the snowbelt areas are showing losses in market share.

Considering the factors I mentioned which have influenced the business climate, how has the asbestos-cement pipe business fared? Let's first look at it from a production viewpoint. This slide shows the location of all the U.S. asbestos-cement plants—past and present. The year on the chart is the approximate date the plant was built, and the number in parenthesis is the total number of machines at the plant's peak production. Those locations in white have all been shut down.

In sales, the A/C industry reached its peak in 1974 with over 900,000 tons shipped. Since that time, the industry has been adjusting its production capabilities to parallel the reduced demand. In 1981, domestic shipments were in the 350,000 ton range. The most recent 1982 projections are now below the 300,000 ton mark.

Looking at various market segments we participate in, you can see that A/C water pipe sales in the west have basically followed national economic trends and sales have remained fairly constant. Conversely, the western and eastern sewer markets have been seriously affected by the economy, the reduction of government sewer spending and the very strong penetration of PVC sewer pipe. These changes in the business climate and the resulting reduction in A/C sewer pipe sales were the primary reasons why the asbestos-cement pipe industry plants were forced to close in the eastern areas. These plants were dependent on the sewer business for a large share of their volume.

The eastern water pipe sales had been declining sharply for several years. This decline is associated mainly with very poor market conditions in the snowbelt, some resurgence of cast iron sales due to its lower cost, thinner wall ductile pipe and the penetration of PVC.

Since PVC pipe has become formidable competition in both the water and sewer markets, to better understand what is taking place in the asbestos-cement pipe business, let's briefly review some comparative PVC data.

PVC sales have increased every year since coming into the market place. This chart shows how the national sales of PVC C-900 compares with national sales of PVC water pipe. As you can see, the lines converge in 1981, and PVC will continue to penetrate the water market at the expense of A/C. This next chart shows how C-900 plus all other types of PVC water pipe (2:1 pipe) have markedly increased their market share—30% in 1971, 69% in 1981. Certainly a remarkable growth. The sewer pipe industry shows a similar pattern with PVC having 3% of the market in 1972 and 65% in 1981. The major portion of this change has been at the expense of the clay pipe share of market.

At the root of many of our recent problems in the asbestos-cement industry have been PVC resin costs. Business Week magazine, in its March 8, 1982 issue, assessed the PVC resin industry's current production capacity and pricing situation. I quote, "While excess capacity will mean poor profit margins for everyone during the next several years, it could have a salvatory long-term effect. Lower prices should make PVC even more

competitive with other material." I am looking forward to hearing what Fred Timpe has to say on this subject later this morning.

This chart, which compares the average annual costs of A/C with PVC pipe without identifiable cost coordinates, shows how the manufacturing cost of asbestos-cement pipe has doubled since 1975 whereas PVC costs have remained fairly constant.

Both asbestos-cement and C-900 PVC are excellent water pipe products. There is little argument that PVC is lighter in weight and less costly to install. Contractors tell us they will allow PVC 15% or more laying advantage over asbestos-cement.

This next chart shows how the cost per foot of PVC has approached the per foot costs of various diameters of asbestos-cement. With a 15% favorable laying advantage coming into play as shown by the blue zone, you can see why we expect asbestos-cement to continue to lose market share to PVC. In our opinion, only a determined asbestos-cement industry effort can retard more dramatic PVC intrusion in the immediate future.

Comparing that chart with this one tracing the sale of various diameters of asbestos-cement pipe in the western reporting regions, you can see that 6" and 8" pipe has, as can be expected, lost ground while 12" sales remain fairly constant.

Unless PVC resin prices go up substantially in the remainder of 1982, PVC pipe poses a very serious threat to all sizes of A/C through 12". Unfortunately, no significant resin price increases are projected before 1983, if then, and I seriously doubt that the 1982 average resin price will even approach the 1981 average. In the meantime, asbestos-cement costs continue to reflect inflationary trends and the effects of lost volume. Needless to say, it is all these competitive factors that have put a profit crunch on our entire industry.

With all of this background, how do we see the pipe markets in the future? Going back to some of my earlier charts, considering the slow start, we do not expect the total U.S. pipe industry in 1982 to be much better than 1981 even though this chart reflects a 5% improvement. This extrapolation was based on a more optimistic prediction for the second half of the year. If we do see some economic turnaround in the second half of '82, then the upward trend should continue into 1983. I do not think, however, that we will see total pipe sales in 1983 matching anything we experienced in the years from 1977 to 1980. I think total recovery of the piping market, as we have known it, will be a long time coming. It may take several years.

With the exception of some special applications, we in J-M feel that all asbestos-cement sales of any significant volume in the future will be in the area west of Mississippi. Furthermore, with the exception of some large diameter business, we feel we will no longer be a major factor in the A/C sewer pipe market in the U.S. Water pipe sales in the west in 1982 will be similar to 1981 sales. This chart is significant because although we are anticipating growth potential in the sunbelt area when the economy does turn around, we unfortunately feel that the asbestos-cement pipe sales recovery will be dampened significantly by PVC pipe's continuing penetration. In short, we look for the sale of asbestos-cement water pipe to remain fairly constant during the next economic upswing.

While I have been addressing what I believe to be the "real world" in the piping industry and in particular the asbestos-cement industry today, I certainly would not want to preach gloom and doom. On the contrary, I believe that asbestos-cement pipe will continue to be a viable business, particularly in the west as long as we, the industry, can

continue to enthusiastically and intelligently support and manage it. It must be recognized that the changing economic and business climate that the entire piping industry is dealing with today, and will be dealing with in the future, demands that we operate in a more cost-effective manner. The business climate cannot support high corporate overhead, large division staffs or even large direct sales forces.

It stands to reason then that if we are going to fight off or slow up competitive pipe penetration in our remaining market, we are going to have to find ways to directly, indirectly and legally pool our reduced human resources to fight the battle together.

Asbestos-cement pipe is still by far one of the best cost-effective products available to the piping industry and we should treat it as such. We as manufacturers have to come out of "the doldrums" and act more forcefully and boldly than we have in the recent past.

Together this week, let's discuss methods that we might carry out through effective programs. Some possibilities include:

1. protecting existing A/C markets with an aggressive resell program in key market areas,
2. to expand existing markets through effective value analysis sales programs,
3. exploring new markets or expanding our activities in markets that have continuing growth potential (e.g., large diameter T-pipe),
4. investigate possibilities of product and process technology development and seek new products and applications, such as J-M's FRP coupling and PVC MOA's, and
5. to carry out an aggressive pro-active rather than reactive A/C and health campaign.

We can assume the attitude that these are "blue sky" thoughts that will never work—which may be right. But, let's not knock them until we try them.

I would like to change the tempo here and say a few words about the Association. The Association is a very important part of our human resources. While we, the manufacturers, have been suffering from battle fatigue, we have not been alone. Our Association staff has been at our side all the way. We have cut their budget, we have threatened their job security and we have forced them to look at new cost-effective, operating methods and directions. Through all of this, Joe Jackson, John Welch, Mary Jackson and Angie Bayless have responded as true professionals. I don't know exactly what mode of operation the Association will be put into in the future, but I certainly endorse the customer-oriented seminars they plan to carry out this year. As a matter of fact, many of the Association's programs address some of the items we just listed as being needed. I am sure Joe Jackson will discuss these plans later in the week. We, as manufacturers, should give the Association staff our full support on these programs. Aside from that, I want to publicly say "thank you" to Angie, Mary, John and Joe for a job well done.

Despite factors such as market acceptance of other cost competitive products, the decline in economic conditions, and the detrimental effects of the asbestos and health issue, I believe that if we, the A/C Pipe Producers Association members, continue

to fully support the existing markets and expand those areas with growth potential, asbestos-cement pipe will continue to maintain its reputation as one of the most reliable materials serving the piping industry today.

RESIN OUTLOOK: U.S.
by
Fred Timpe
President, Pipe & Plastic Division
CertainTeed Corporation

Good morning. My presentation focuses on the PVC resin industry. I will be addressing four topics for your consideration.

1. The existing structure of the PVC resin industry.
2. The current demand for PVC resin.
3. The outlook for 1983.
4. The implications of this outlook for PVC pipe and for other competing piping materials

In 1981, there were 18 producers in the industry. This slide shows the relative importance of the ten largest producers. B.F. Goodrich clearly has the largest market share, accounting for 22.2% of all nameplate capacity. Almost 60% of the industry's production capability in 1981 was controlled by the top five firms.

In the last decade, there has been only one newcomer to the industry—Formosa Plastics. This company appears to have positioned itself well to be a factor in the long run in the manufacture of PVC resin. Negotiations have included:

1. a joint venture with ARCO for ethylene,
2. a joint venture agreement with ALCOA for chlorine,
3. the acquisition of ICI's VCM facility in Baton Rouge, Louisiana,
4. the acquisition of Stauffer's PVC facility in Delaware City, Delaware,
5. the proposed VCM/PVC grassroots plant in Point Comfort, Texas.

Other PVC resin producers integrated backward into some or all of the chemical feedstocks used in resin manufacture are listed here. It is apparent that B. F. Goodrich is the only firm with roots in all three chemical derivatives.

Tenneco stands alone among the top five producers with no degree of backward integration whatsoever.

Recently, the industry structure has been shaken by the decisions of several firms who have decided to exit the business.

- o Stauffer has been in the exiting process since May of 1981 when it sold its Delaware City plant to Formosa Plastics. More recently, Stauffer's has announced that it will close its 150 million pound PVC facility in Long Beach, California. The company claims that California's excessively stringent environmental requirements played a contributing role in the shutdown. Stauffer intends to raze the facility and will develop the property for other purposes.
- o Pantasote has permanently closed its Point Pleasant, West Virginia, facility, leaving it with only approximately 55 million pounds of nameplate capacity at its Passaic, New Jersey, facility.

General Tire and Rubber, another small producer like Pantasote, has announced the closing of two plants: one in Ashtabula, Ohio, with 120 million pounds of capacity and another in Point Pleasant, West Virginia, with 55 million pounds of capacity.

Diamond Shamrock, like Stauffer, has been exiting the industry since 1981 when it sold one of its two Deer Park, Texas, plants with 260 million pounds of capacity to B. F. Goodrich. In the past month, Diamond sold its 150 million pound plant at Delaware City to Ethyl Corporation. It is currently seeking a buyer for its one remaining facility at

Deer Park, Texas. This facility has 230 million pounds of capacity. It is important to note for purposes of this analysis, however, that this capacity will remain within the industry base.

Tenneco is another producer seeking to withdraw from the industry. Its capacity will not be withdrawn, however, since it is public knowledge that Chemische Werke Huels has been negotiating to make the purchase.

Temporary shutdowns have also impacted the industry.

- o Air Products has closed its Calvert City plant with 210 million pounds of capacity, and there is some speculation within the industry as to whether this plant will be reopened. Management has let it be known, however, that it will be started up just as soon as volume justifies it.
- o Formosa Plastics has closed its Delaware City plant, reportedly because of technical difficulties. It is rumored to come back up in May.

Despite the current shakedown, two producers—B. F. Goodrich and Formosa Plastics—remain bullish about the PVC industry. Their long-term commitment is evident in planned capacity expansions.

B. F. Goodrich has announced plans for 300 million pounds of additional capacity at its Pedricktown, New Jersey; Avon Lake, Ohio; and Louisville, Kentucky, plants. In addition, they have disclosed plans for an additional 1.1 billion pounds of capacity at an undisclosed site.

Formosa Plastics expects to add 530 million pounds/year at Point Comfort, Texas, in 1982. This addition is part of an EDC/VCM/PVC complex with chlorine coming from ALCOA and ethylene coming from ARCO.

In summary, what we see is an industry that has increased its supply base from 5.8 billion pounds in 1974 to 8.3 billion pounds in 1981. We see also an industry where, because of a lengthy recession, the structure is becoming more concentrated. We see an industry in retrenchment as 400 million pounds of capacity are withdrawn; and at the same time, amazing as it sounds, we see an industry where participants have announced their long-term plans to grow and expand in the next decade.

Let's now look at the demand for PVC resin. What products require PVC resin? How has demand for these products grown? Has demand outstripped the supply base of the industry and is it likely to do so in the future?

PVC demand is generally divided about evenly into flexible and rigid resins. Flexible grades are used in calendared sheets, tablecloths, shower curtains, furniture, automobile upholstery and coated wire and cable. Rigid grades go into pipe, fittings, roofing, siding, blow-molded fottles and automobile parts. This slide shows the markets in which PVC resin is used and some of the applications within each market for PVC resin.

The effect of the current recession on PVC demand is more easily understood by examining PVC's atypical end-use distribution profile. More than half of the PVC resin produced is consumed by the building and construction industry, whereas less than 10% of non-PVC thermoplastics share this end-use.

Pipe demand is the major application for resin within the building and construction category and accounts for almost 40% of total resin demand. This slide shows how pipe demand has grown compared to all other domestic end-uses, to exports, and to the total demand for resin. What it tells us is that pipe demand is the driving force behind recent changes in the demand for resin. As you can see, both exports and domestic applications other than pipe have been relatively stable over the past four years, whereas pipe demand has been quite volatile.

When we contrast historical demand with supply, we discover that the capacity utilization rate within the industry has been less than satisfactory for the past two years. As the slide indicates, the industry utilized only about 76% of its effective capacity in 1980 and less than 70% in 1981.

What can we expect in the future? Is this supply/demand imbalance likely to continue; and if it does, what are the implications for us, as producers of asbestos-cement pipe?

In my opinion, the supply/demand imbalance is not only likely to continue but will do so for some time. My reasons for believing this may be reduced to three, namely

- o cheaper feedstocks
- o fewer exports
- o low demand

Let us address each of these topics in turn.

This chart summarizes the feedstocks leading to the polymerization of PVC and subsequently, the fabrication of vinyl products. Graphically, it is apparent that VCM is the building block for vinyl plastics, and for all practical purposes, all VCM is used for the production of PVC resin. Graphically, it is also apparent that both ethylene and chlorine are feedstocks for the VCM portion of the fabrication process.

Much time could be spent discussing the impact of crude oil prices and how changes in them impact the petrochemical chain we are about to examine. However, since this is a topic beyond the scope of this discussion, I would draw your attention only to the following facts.

Although the OPEC benchmark price has dropped recently to \$34 per barrel, Great Britain and Norway have undercut the system, dropping their pricing \$6 a barrel to \$28. This change has put tremendous pressure on countries like Nigeria, Algeria, and Libya to reduce their pricing because of the equal quality in the product offered. Some people are predicting that crude oil could drop to \$25 a barrel.

Ethylene, the first feedstock in our petrochemical chain, has been in trouble for some time. Consumption of its derivative products, polyethylene and ethylene oxide, has dropped off considerably in recent months. As a result, the industry has been utilizing only about 60% of its effective capacity. A planned expansion by Shell of 1.5 billion pounds, scheduled to come on stream in 1982, adds a further dimension to the supply-demand imbalance.

In response to the current situation, many companies have idled ethylene capacity, while others, like Cities Services, have withdrawn permanently from the industry.

The reductions in supply have not been sufficient to prevent price erosion. Ethylene prices have fallen from a high of 29-1/2¢ a pound in 1980 to a market price of 18-1/2¢ announced by Exxon and spot pricing on the Gulf Coast is now lower than 16¢/pound.

This in turn has triggered much lower VCM and PVC pricing which we will discuss later.

Chlorine, the pungent green gas used in the manufacture of VCM, has become more toxic to its producers than to anyone else. It could well be the financially sickest major product in the chemical industry. A combination of miserable markets, overinvestment in plants and soaring energy costs has left the industry thoroughly crippled.

As the slide indicates, only 10.8 million tons were produced in 1981, utilizing only about 74% of the industry's capacity. Perhaps the most positive statement that can be made about this industry is that little or no new chlorine capacity will be added over the next five years and old, small plants are likely to be shut down, as producers with captive markets find it cheaper to purchase chlorine on the outside.

This graph shows total nameplate capacity for VCM to be 9.2 million pounds through 1981. It reflects also a production level of approximately 6.5 billion pounds, including 900 million pounds for export. This translates to an average operating rate of 72%—down 8% from 1980 and nearly 20% from 1979. In large measure, the declining operating rate is the result of two factors: (1) the start-up, in 1981, of one billion pounds of capacity by Georgia Pacific and 500 million pounds by PPG, and (2) decreased demand.

Capacity additions by several producers are scheduled for start-up in the years from 1982-84. Whether these expansions are completed on time, or ever, remains to be seen.

It is likely that VCM prices will remain low in the near future as long as the level of underutilized capacity retards profitability. Only the cost of regulatory compliance and the large capital outlay required for a new grassroots VCM plant may serve to limit additions to capacity.

In each of the petrochemical markets we've examined, the dynamics are the same: there is too much supply relative to the present level of demand. Prices have fallen dramatically in response.

However, feedstock costs have also fallen, lowering the average cost curve for each producer. The net result is that some inefficient producers are not being forced out of the industry because of insufficient profitability. Rather, some are encouraged to stay as working capital requirements fall in response to price erosion. This explains why we believe that the needed upward shift in the industry's supply curve, indicative of capacity being withdrawn, is not of sufficient magnitude to effect a significant change in suppliers. This slide conceptualizes a relatively static supply curve.

Disclosure of plans by Saudi Arabia, Canada, and Mexico to build worldscale cracking plants provides the second reason for believing the demand/supply imbalance in the PVC industry will continue for a long time. As a result of this proposed world buildup, net exports of U.S. thermoplastics are projected to fall by 35% by 1985 from the 3.3 billion pounds exported in 1980.

In addition, if the proposed world buildup materializes, not only will U.S. firms find it more difficult to compete in the international arena, but overcapacity in world chemical markets will become a fact of life for at least a decade. More importantly, the emergence of new production centers will cause vast structural changes in the world chemical industry.

For purposes of our discussion, this means there will be downward pressure on the demand curve for PVC resin and on the demand curve of each of its feedstocks. The end result is that the price of resin is likely to remain low in the ensuing months.

Finally, we turn our attention to the demand for PVC pipe resin. You will recall that earlier I suggested that changes in the demand for pipe resin are the major driving force behind changes in the demand for PVC resin.

This slide shows that there is a definite correlation between the demand for housing and the demand for PVC pipe. You will recall that Agnes suggested that the recovery is expected to be slow and uncertain.

Therefore, the positive changes in demand that could effect better utilization rates in each of the industries we discussed are likely to be too small to effect substantial price increases.

Let me summarize; we have seen that each of the chemical derivative industries basic to PVC have substantial excess capacity at present.

We have seen these industries are not likely to be as successful in the international arena in the future as they were in the past, as countries that were not importers of chemical products enter the export business themselves.

We have seen that growth in the demand for PVC pipe is likely to be low relative to the growth rates experienced in the '70's.

Therefore, it seems likely that as each of these factors converge, the price of PVC resin is likely to show little, if any, substantial increase in the near future. This leads me to believe that PVC pipe must be reckoned with as a very formidable competitor in all piping markets including ductile iron, reinforced concrete, prestressed concrete, concrete, clay, ABS and HDPE for the next five years.

If we as an industry are to survive, the conclusion is clear: pressure must be exerted by all of us to convince asbestos fiber suppliers to resist fiber price increases.

FIBER OUTLOOK: U.S.
by
Warren Whitley
President
CAPCO Pipe Company, Inc.

You have all heard the talks that have preceded my discussion. Mine is the outlook for asbestos fiber; and at this point, I am not too sure the order of presentation was correct, or in reality, whether any particular order would have changed the "outlook" is extremely doubtful. However, it does remain a fact of life that the impact of the predictions already given leave little hope that I can in any way alter those predictions.

The one major difference that I will speak to that undoubtedly is not as strong a point mentioned thus far is the fact that asbestos fiber has worldwide consequences apart, yet not totally separated from, the complications within the Continental United States. One of the bright spots of the world happens to be just where we are meeting. I have read recently in the magazine World Water about the larger projects being undertaken in Mexico City and to irrigate the vast desert area of the northwest.

I must point out to you at this point that I am not an expert in asbestos fiber marketing, and I am sure that many of you in the audience could do a much more superb job on the subject than I. The only qualification I have as an expert on the subject is that I am presently more than 50 miles from home.

For the theme of my discussion, I thought it would be of interest to look at the fiber industry for 1976 and compare it with what the industry did in 1980. I have chosen the Year 1976 because in 1975, the industry had a major strike, and obviously, the statistics for that year would be rather distorted. To take 1974 I thought was just as unfair because that was the year that anybody could sell anything for any price. The Year 1980 was chosen as a comparison primarily because those were the last complete statistics that I have available to me. I am sure that each day more of the 1981 statistics are coming out, but I do not believe that 1981 will be that much different from 1980 except slightly less in many categories.

For all statistical comparisons I have used the QAMA annual reports. You all know there are several publications published regularly, but it was difficult to obtain comparisons because some included the Advocate property and some did not. Others included Nordaham production in Canada figures while others considered it outside Canada. It is assumed that to some degree of relativity those properties not included in QAMA reports have similar experiences.

There have been some significant changes over these four years, and it may be of interest to review before embarking into the unknown—the future prospects for the industry. I will try to compare such areas of production, sales by grade, sales by area of the world, ownership of production, and prices listed by the producing companies. Possibly the latter is not the real world, but at least it will give us some idea of the change that has taken place. (Attachment 1)

World asbestos production, as shown in Attachment II, is broken down by the the three largest areas of production and all others. All others includes the United States, Australia, Yugoslavia, and a few other small producers. These figures are in million short tons.

Since approximately 96-97% of the fibers imported to the United States are from neighboring Canada, comparing the sales of various QAMA Canadian producers is listed in thousands of metric tons. (Attachment III) Other producers not included in QAMA, it is assumed, have the same experiences very close to the companies shown.

Asbestos fiber, as I mentioned earlier, is produced mainly in three areas of the world (Russia, Canada, and Africa); yet, the market area is worldwide. This unique

material covers the spectrum of need from the most basic use to provide shelter, to supplying water for barest needs, to the requirements of the most industrialized nations for products such as brake linings to help stop a 747 airplane or a Mercedes Benz automobile. With the uniqueness of uses, I thought it would be of interest to show the areas where asbestos fiber is marketed throughout the world. Comparing the two years and considering the grades of Canadian fiber most used in A/C pipe, the comparison looks like this for Group 4-5 fiber. (Attachment IV)

Comparison over time is very interesting. This is Canadian fiber for Grades 4-5. I do not have a comparable chart for the African fiber markets; however, I would think that the areas served by the African mines would show a similar distribution.

Over the period of time I have chosen to look at the asbestos fiber industry, some of the more significant changes that have occurred is the change of ownership in some of the properties. Why some of these changes were instituted is not for me to speculate; however, I am sure that there are several basic reasons for seeking changes. Some properties changed ownership undoubtedly because of the mood of the country toward asbestos in which the owners were domiciled. I am just as certain changes took place for economic reasons. Some companies probably looked at their holdings and ascertained that the viability of the product, because of its problems, had a limited life; and therefore, the best time to sell was while the properties still had some value. Then also we have the nationalistic consideration which is not only taking place in Canada in the asbestos industry but many other countries with natural resource industries. Naturally in this comparison we will eliminate Russia for obvious reasons. (Attachment V)

Not only has control changed, but during the latter half of 1980 and beginning 1981, several properties have had or contemplate extensive closings. I do not know this for a fact, but I was told the closings of the mines is a first in over 50 years.

The most interesting comparison for the period involved that of prices. Now I do not intend to discuss the myriad of prices that may have been reality for any given time or what special contracts could have been in effect. I will and we must assume that any individual agreements had some relationship to the basic prices. Secondly, I do not know how many producers are in the audience; and I am sure they will and can discuss real prices relative to the Canadian Dollar premiums or discount or looking through the eyes of the consumer what the same premium or discount meant to them in their individual countries. As I mentioned, this comparison is just a bird's-eye view at best of what the mining industry tried to obtain. Again for the interest of this group, I have used the pricing for Grades 4-5 Chrysotile and Crocidolite grades most prevalent for the cement-asbestos pipe industry. (Attachment VI)

Now we can leave the factual portion of my discussion and delve into the unknown—the future—what is the outlook for asbestos fiber. Here we get into the personal portion of the discussion and an area where I am sure many of you have your own personal feelings regarding the prospects for the future and possibly other areas of discussion that should have been covered as to their impact on the future.

Considering the short-term outlook, there appears to be little prospect for any major pickup in the asbestos fiber business for the balance of the Year 1982. As I mentioned briefly earlier, several of the mines have discontinued operations for varying periods of time in order to reduce the overwhelming inventories that are currently on hand. It is reported that there are 300,000 metric tons of inventory in Canada alone and approximately 500,000 tons in inventory on a worldwide basis. Considering the fact that in 1980 the QAMA members sold a little over one-million metric tons of fiber of all

grades, it is not difficult to see the impact that the inventories have on the present situation. I would assume that in the short term there is little hope of increasing prices of asbestos fiber and more than likely the pressure of the inventories and the needed cash flow of some properties may very well depress pricing further as the year goes on.

Speaking specifically about A/C pipe, there is a great deal of pressure on the pricing of pipe, brought about to a large degree by the competitive position of competing products. As you know, ductile iron costs relate directly to the cost of scrap iron. Scrap iron is a very competitive commodity quoted daily in the papers. As I write this portion of the paper, scrap iron is quoted at \$71 per ton against one year ago of \$115 per ton for a decline of 38%. We find a comparable situation in the PVC pipe market as well. Many of you know that CAPCO ventured into its own production facilities for PVC pipe just about two years ago this month, and I know the first resin we purchased was 30-1/2¢ per pound with the present market of 19¢ per pound. Isn't it coincidental that the resin price has declined 37% over this period? I do not believe that we find the sensitivity to the price of fiber as it relates to the cost of producing A/C pipe. When we consider the fact that fiber represents 40-50% of the cost of finished product, there is a definite impact on the demand for fiber when its pricing is inelastic to the price of the finished product. With a rather significant portion of the fiber production allocated to A/C pipe, 15-16%, there is little doubt that there will be considerable pressure on this side of the market for some time.

This situation is not unlike what the U.S. automotive industry is going through today. The U.S. auto industry virtually ignored lower-priced foreign automobiles until they realized that their cost made it impossible to compete. I would hope that the fiber producers do not wait as long as the automotive manufacturers did before realizing that the market disappeared to competitive products before trying to lower their costs in an effort to be more competitive and maintain market share; however, as I mentioned earlier, there is nowhere near the pressure on the asbestos fiber producers to consider any one market or any one product because of the varied use and worldwide distribution for asbestos fiber.

Looking toward the long-term position, there are three areas that I believe will have an impact on the asbestos fiber industry, the first being the area of substitute products. There is constant research being performed today by many companies in an effort to find substitute materials for asbestos fiber. It is estimated that the industry has lost approximately 250,000 tons to substitutes to date. If this particular area is not spoken to or research develops new uses for asbestos fiber, it is more likely that this 250,000 tons will grow—then diminish. Recently I read where the University of California ceramics expert found he could melt marble chips found in huge stockpiles in Vermont; and by doing so, the resulting fiber was an ideal replacement for asbestos in reinforcing concrete. The question invariably arises as to how safe and at what cost substitutes face as opposed to the known costs and carcinogenic effects of asbestos fiber.

The area of substitutes, of course, leads one to consider the long-term effects of the health issue. The health issue is one that beyond question is extremely delicate to speak to because there has been and will be considerable controversy over this subject matter for some time. There is no doubt that the health issue will have a dampening effect on the future growth of the material; however, my personal reaction is that the issue of health is far more economic than health as far as finished products are concerned. The issue of health is difficult to assess. The competitive situation of substitute products will have as much or more of an impact on the use of asbestos fibers in the future as the issue of health. The third long-term consideration is the fact that we are all learning to use less fiber in our product than we have previously. The reduction of

1 or 2 or 5% of the content of fiber in the finished product will have a very serious effect on the quantity of asbestos fiber sold in the future. Considering the fact that the industry maintains its traditional position, this fact alone could affect thousands of tons of production.

The thought of how much an impact the health issue has had on the asbestos fiber industry is quite varied. The figures that I showed you regarding the sales of QAMA members between 1976 and 1980 were down considerably; however, how much of this was health or how much was economic will be a subject for debate for many years.

There is little doubt that the real future of the asbestos fiber industry hinges on the less industrialized countries. There is considerable use and need in the third world for asbestos fiber, and I am sure there will be significant markets for the industry to replace some of its lost traditional markets in the industrialized nations; but this is not a panacea for the fiber industry because it is these countries that find it difficult to have sufficient hard currency to pay for their imports—a greater problem than their wishes to improve their standard of living.

I appreciate the opportunity to share my thoughts on the asbestos fiber industry with you, and I thank you very much.

QAMA SALES — U.S.A.

Metric Tons

<u>Grade</u>	<u>1 9 7 6</u>	<u>1 9 8 0</u>	<u>Percent Decrease</u>
3	4,453	1,830	59
4	41,915	22,180	47
5	32,300	17,459	47
6	62,603	29,302	53
7	349,017	227,626	35
TOTAL	490,788	298,397	39 Average.

WORLD ASBESTOS PRODUCTION

Million Short Tons

	<u>1976</u>	<u>%</u>	<u>1980</u>	<u>%</u>
Russia	2.52	45	2.37	45
Canada	1.69	30	1.42	27
Africa	.64	11	.61	11
Others	<u>.77</u>	14	<u>.91</u>	17
TOTAL	5.62		5.31	

A L L G R A D E S

U. S. A.

Metric Tons

<u>Producers</u>	<u>1976</u>	<u>%</u>	<u>1980</u>	<u>%</u>
Canadian J-M	313,257	64	165,944	55
LAQ	75,913	15	61,815	21
Asbestos Corp.	14,893	03	2,944	01
Carey Canadian	78,745	16	61,692	21
Bell Asbestos	7,983	02	6,002	02
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
TOTAL	490,791	100%	298,397	100%

WORLD MARKETS

SHORT TONS

	1 9 7 6		1 9 8 0	
	Tons	%	Tons	%
Europe	169,185	.362	181,387	.383
Middle East	13,242	.028	2,404	.005
Africa	15,300	.033	35,885	.076
Asia	85,195	.182	113,680	.239
Oceania	19,954	.043	15,207	.032
S & C America	67,014	.143	74,006	.156
North America	97,954	.209	51,473	.109
TOTAL	467,844	100%	474,042	100%

CANADIAN PRODUCERSSOUTH AFRICAN MINES

Advocate Mines Ltd.

76 - Eternit/J-M
81 - Closed 12/31/81

Asbestos Corp.

76 - General Dynamics
81 - Quebec Gov. 12/81

Bell Asbestos Ltd.

76 - Turner Newell
81 - Quebec Gov. 10/80

Cassiar

76 - Turner Newell-Hardy
81 - Brinco

Campbell Resources Ltd.

76 - None
81 - United Asbestos

Carey Canada Ltd.

76 - Jim Walter Corporation
81 - Jim Walter Corporation

Johns-Manville Canada

No Change

Lac d'Amiante du Quebec, Ltee

No Change

G. E. F. C. O.

76 - General Mining Company
81 - General Mining Company

Cape Asbestos

76 - Cape Asbestos U.K.
81 - General Mining Company

S. A. Asbestos Trading Limited

76 - Eternit
81 - General Mining

P R I C I N G
Cement-Asbestos Pipe Grades

Canadian \$	Canadian Fiber S/T	4T	5R
	1976	\$492	\$323
	1977	561	368
	1978	642	421
	1979	687	450
	1980	863	560
	1981	967	635
Increase Percentage		96.5%	96.6%

U.S. \$	African Blue	M/T	Long	Medium
	1976		\$578	\$539
	1977		665	620
	1978		698	651
	1979		733	684
	1980		768	716
	1981		786	716
Increase Percentage			36%	33%

Canadian Prices are FOB the mine.
South African Prices are FOB South Africa.

OPENING REMARKS - SESSION II

by
Etienne van der Rest
Chairman
S.A. Eternit

When Joe Jackson asked me to be the moderator of this second day of conference, I looked into the dictionary to learn what should be my task. The dictionary mentions that a moderator is a man who is supposed to calm the excited people, try to moderate the view expressed by too enthusiastic gentlemen and finally to take the necessary steps in order to reach together reasonable conclusions.

After having heard yesterday the different exposes, I really wonder whether it is a moderator that we are in need of or an activator because everybody seems to be so depressed. Anyway, I shall do my best.

I was told that the first part of my mission is to make an introduction. This will be especially short because lately I read the point of view of an European minister who was telling quite exactly: "the most important things can be expressed briefly. The Lord's prayer has 56 words, the 10 commandments 297 words, the American Declaration of Independence 300 words, but the EEC directive for importing caramels 26,911 words!" The moral is obvious.

We are all convinced that in fact all of us are in the same boat since there is an interactive effect of what is happening in one country on all the others.

As an example, the famous Califano statement was taken over by all the newspapers in Europe. Regulation in EEC may have an influence on future U.S.A. regulation and vice-versa.

It is true that today we are, most of us, in a very difficult situation due to three main facts:

1. The general economic situation,
2. The competitive situation of our products,
3. Asbestos and health.

I believe there is too often a tendency of our sales people to give too much importance to the asbestos and health effect in order to explain the drop in their sales. That might be one of the reasons why in some countries people become so pessimistic as regards A/C and the health issue. In reality, I am personally convinced that the key reason is the general economic situation and the competition from non-A/C pipes.

But these three negative factors must not have as a consequence that we forget the positive factors which are pleading for installing A/C pipes.

Yesterday we have examined the situation in the U.S.A., today we will look into the situation in the rest of the world. We will examine first of all the regulations in the EEC and further on, the situation in some countries where the problems are particularly acute. I really do hope that within these exposes we shall find some very good reasons to be more optimistic and finish the day in being more confident in the product than we were yesterday.

REGULATORY OUTLOOK: E.E.C.

by

Etienne van der Rest

Chairman

S.A. Eternit

It is only eight days since your President, Joe Jackson, called me up to ask me to make a presentation to your assembly regarding the regulations in the E.E.C. You know as well as I do that to answer him "No" was needless, even if I had preferred to deny his query.

Since I had some meetings in the U.K. as well as boards of directors of various companies of our Group the week before coming here, there was no time to prepare my presentation.

So, I am pleading for your indulgency, especially for the quality of the slides which need to be updated. In fact, I took some of them quickly before leaving, and we will discover them together right now.

Slide 1 will remind you of the names of the member countries of the EEC. To give you an idea of the importance of the asbestos industry in the EEC countries, within the EEC there are about 508 different factories using asbestos as a raw material and employing 82,000 workers. If you add those indirectly involved in the business (people placing the product on the roofs or the pipes in the ground, etc.), you have to multiply these figures by a factor of at least 6 or 7.

Slide 2 gives you the key institutions of the EEC.

Slide 3 shows you the procedure of a Council Directive before it becomes effective. For the two main directives of which we will speak a little bit later (condition of work in the factories and free exchange of goods), Stages 1, 2, and 3 are already achieved, so we are now at the final stage, 4.

Before entering into details, I can tell you that in general, the proposed directive from the Commission still permits the industry to live. They have been submitted to the Economic and Social Committee which has given a rather negative opinion; but fortunately for us, the importance of the Economic and Social Committee is today much under discussion. The European Parliament, on the contrary, gave a very positive opinion which is of paramount importance since its opinion has considerable weight on the final discussion of the Council of Ministers.

Slide 4 gives you the name of the key "general directives" which are involved in the asbestos and health issue.

Slide 5 gives you, at the top of the slide, the key draft of directives which are specific to asbestos. Details will follow in Slide 6.

At the bottom of the same slide, you may note the EEC regulations which are not specific to asbestos but include asbestos with other substances.

As regards the first one, "Directive on Toxic and Dangerous Waste Disposal", I do not want to enter into details because it is not especially detrimental to the industry; but if you like, I can send you a copy of this directive which has already been approved.

The second directive concerns "Classification, Packaging and Labelling of Dangerous Toxic Substances". As regards classification, this regulation is imposing an obligation on every industry to ask permission to put on the market new "dangerous substances". This is not applicable to asbestos, which is a known product for many years. On the contrary, the question of labelling is applicable to asbestos. There again the next slide will give you more details.

The third directive concerns "Environmental Impact". A preliminary study of the impact on environment is today an obligation for every new factory or enlarging of an existing factory employing dangerous substances such as asbestos. If this report is negative, the Commission may refuse the authorization.

The fourth directive concerns "Carcinogenic Substances". In fact, this is not applicable to asbestos, as it is already covered by DG5 (see Point I of the EEC regulation specific to asbestos).

We come now to Slide 6 where Points 1 and 2 refer to the directive for the conditions at work (DGV):

1. Crocidolite 0.2, other fibers 1 fiber/cm³

This is the proposal of the Commission itself which has been accepted by the European Parliament. It must be well understood that the 0.2 fiber/cm³ for crocidolite is calculated following the same proportion as in the mix itself. The text of the Commission which has been now approved by the European Parliament is quite clear. It is written as follows:

"In the case of a mixture in which crocidolite is used, the concentration shall be either analysed directly or calculated on the assumption that the proportion of crocidolite present in the mixture is equivalent to that in the air."

Within the Coreper, discussion is open. The danger still exists that as regards crocidolite, they would like to mention that if you use crocidolite, the 0.2 concentration should apply to all the mix itself. This is, of course, not admissible since it would mean to ban any mixture containing crocidolite; nobody can assume such a low figure today.

2. Asbestos Exposure (DGV)

The Commission proposal is not clear since it does not give a strict definition of what is a worker exposed to asbestos. The European Parliament (EP) has been much clearer in this respect. For the EP, exposure to asbestos includes only the worker who is exposed to concentrations higher than 0.1 for crocidolite and 0.5 for other fibers, calculated in relation to a reference period of 8 hours. This, of course, is of tremendous importance because by doing so, the people working temporarily on the site with asbestos-containing products would not be submitted to the regulations, medical examinations, etc.

Within the Coreper, discussions are still going on, but we do hope that the opinion of the European Parliament will be taken into account in the debate.

3. DGIII

The Commission prohibits the use of a very limited number of applications of products containing chrysotile as, for instance, insulation products, etc., except if harmful release of fibers can be avoided.

The European Parliament has established a much longer list of prohibited products, but with a very important "escape clause". When the concentration can

be proved to be inferior to 0.2 fibers/cm³ for crocidolite and 1 fiber/cm³ for other fibers, this prohibition does not apply.

In Coreper the discussion is going on. There is a tendency for having "no escape clause" which would be absolutely detrimental to the industry.

4. Non-essential Uses

This is specially for spraying, toys, and decorative products with decorative purposes only. What is very important is the fact that the European Parliament has rejected the proposal to have a full list of substitute finished products for asbestos-containing products.

5. Crocidolite with Exception

The Commission proposal was to admit the exception for asbestos-cement pipes with no limitation on diameter. The European Parliament has limited the use of crocidolite to the pipes of diameters above 800 mm. Coreper may finally decide to admit the exception; but if member states want to be more strict, even prohibiting crocidolite for all uses, they should be authorized to do so.

6. Crocidolite Limited in Time

European Parliament: No mention.

Coreper: Some members propose the authorization be renewed every single year.

7/8. Labelling

European Parliament: Recommends labelling each asbestos-containing product with practically the AIA label.

Coreper: The AIA label could be accepted, but some countries would like to add the word "may cause cancer". This could be the case in the future for the asbestos bags, but the chances to adopt the AIA label for asbestos-containing products remain very high.

DGXI -	Emission Limit	)	
	Discharge	)	Points 9, 10, and 11
	New	)	

9. Emission Limit

The values which are quoted are 0.1 mg./f./m³ of air or 0.5 mg. dust/cm³. There is still discussion on how often these measurements must be made. The first proposal of the Commission has been quickly demonstrated to be impossible. Method of measuring is also today under discussion.

10: Discharge

Water being discharged by a fiber-cement factory should not exceed 0.2 m³ per ton of fiber-cement produced. The discharge water should, moreover, not contain more than 30 mgr. of solid matter per liter of water and also comply with the following:

CR⁺⁶ = 0.1 mgr./liter

Ph: 6 to 9

Temperature: less than 30°C

11. New: Contact of Food Stuffs with Asbestos-containing Products

This is only a first discussion with the Commission. Needless to say, we will follow this work closely since it may have a direct consequence for the use of A/C pipes.

If we have to make a resume:

- a. We may hope that the final decision of the Council on the DGIII proposal will be:
 - o interdiction of crocidolite, but with the exception of asbestos-cement pipes and packing and jointing,
 - o interdiction of some uses of other fibers except if harmful emission of fiber can be avoided.
- b. As regards DGV, concentration in the factory should be 0.2 fiber per cm³ calculated in proportion to the mix for crocidolite and 1 fiber per cm³ for all other fibers. As explained hereabove, a clear definition on which are the workers exposed to asbestos is still being discussed. It is of paramount importance due to the fact that it may concern people working on site.
- c. As regards timing, these 2 directives should normally be given by the Council of Ministers before the end of 1982.
- d. As regards the DGXI emission limit and discharge, there is certainly no question that it should come out before the end of 1983.

Thanks to the almost daily contacts we had with the civil servants of the Commission, with most of the 440 European Deputies and with the government representatives within the Coreper, we may be rather optimistic about final decisions to be taken by the Council of Ministers, knowing anyway that a bad surprise can always occur at the last moment.

If this positive result has been possible, it is due to the very close collaboration which has existed through AIA delegates of the 10 country members of the EEC. A monthly meeting of the EAC (European Advisory Council of the AIA) has permitted us to coordinate the points of view to be presented to these official national delegates.

I believe this is a good example illustrating that with effective coordination of efforts and with enough time dedicated to a political approach (the final decision-making people being generally not scientific but political people), positive solutions can always be found to the most difficult problems.

MARKET OUTLOOK: E.E.C.

by

Bernard Giboin
Director of Fiber Purchases
& International Relations
Everitube

EUROPE GENERAL DATA

COUNTRY	P O P U L A T I O N										G. N. P.			
	GROSS FIGURES (IN MILLIONS) 1981	ANNUAL GROWTH RATE					ANNUAL GROWTH RATE							
		1969 1974	1974 1979	1981	1982 1985	1985 1988	1969 1974	1974 1979	1981	1982 1985	1985 1988			
FRANCE	54.08	0.8	0.4	0.5	0.5	0.5	5.1	2.9	0	2.7	3.0			
GREAT BRITAIN	56.00		0.2	0.15	0.2	0.2	2.4	2	-2.5	+1	+2			
WEST GERMANY	60.75	0.5	-0.2	0.2	0	0	3.6	2.7	-1.2	2.8	2.8			
ITALY	57.43	0.8	0.5	0.2	0.2	0.2	4.3	2.3	-0.5	3.2	3.2			
BELGIUM	9.88	0.3	0.2	0.1	0.1	0.1	5.0	2.0	-0.7	2.0	1.5			
HOLLAND	14.24	1.0	0.7	0.9	0.8	0.8	4.7	2.3	-1.1	1.5	2.0			
SPAIN	38.22	1.1	1.1	0.8	0.7	0.6	6.1	2.1	1.5	2.8	3.0			
SWITZERLAND	6.37	1.0	-0.3	0.4	0.4	0.3	3.6	-1.1	0.4	3.2	2.2			
SWEDEN	8.36	0.5	0.3	0.2	0.1	0.1	2.8	1.2	-1.1	2.5	2.5			
T O T A L	305.33													
U.S.A.	223.8	0.9	0.8	0.9	0.9	0.9	2.5	3.3	1.8	3.5	2.5			
BRAZIL	125.8	2.8	2.8	2.3	2.3	2.3	11.5	6.3	0	4.7	5.0			

ESTIMATED PRODUCTION 1980 (MT)

COUNTRY	PRODUCTION	IMPORTATIONS	EXPORTATIONS	PRESSURE PIPES		SEWER PIPES	
					%		%
FRANCE	154,000	15,800	14,600	14,000	9	140,000	91
WEST GERMANY	129,000	2,800	13,000	79,000	61	50,000	39
ITALY	185,000	5,000	45,000	148,000	80	37,000	20
BELGIUM/LUXEMB.	45,000	4,100	26,600	15,000	33.5	30,000	66.5
HOLLAND	18,000	12,100	400	9,000	50	9,000	50
SPAIN	150,000	-	10,000	? (110,000)		?(15,000)	
GREAT BRITAIN	30,000	2,200	4,200	30,000	100		0
GREECE	35,000	-	5,700	28,000	80	7,000	20
IRELAND	25,000	2,300	400	?		?	
DENMARK	0						
T O T A L	771,000			323,000 (54%)	596,000	273,000 (46%)	

FRANCE

Pressure Pipe Market

The pressure pipe market is characterized by a gradual decline from 1979 to 1981 (0.5% annually) which should continue for the period 1982/1985.

Estimated Total Pressure Market 10³ MT A/C Equivalent

<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1985</u>
554	551	548	546	537

This decline is due to a level of infrastructure close to the saturation point.

In French urban communities 86% were equipped with a network in 1961, whereas today nearly 100% are equipped. In rural communes nearly 90% are equipped as compared to 77% in 1970 and 88% in 1975.

Asbestos-cement pipes, with an already small market share, continue to lose ground to plastics as do the other materials present, such as cast iron and steel.*

	<u>1975/1979</u>	<u>1979/1985</u>	<u>Trends</u>
Cast Iron	71%	64%	
Steel	13%	12%	
Asbestos-Cement	7%	7%	
Plastics	8%	16%	
Autres	<u>1%</u>	<u>1%</u>	
Total	100%	100%	

(Information Source: Battelle)

*N.B. - The above market shares are calculated using gross figures in KM/Years.

Sewage Pipe Market

The French sewage, or flue-pipe, market constitutes a far greater and more dynamic potential for asbestos-cement than does the pressure pipe market.

This is primarily due to the peculiarities of the French sewage system.

- o First of all, septic tanks ("individual sewage evacuation") are still widely used.

In 1975, 66% of French households were connected to a public sewage network as compared to 75% in Italy and 86% in West Germany.

- o Secondly, it is compulsory in France since 1964 to use two separate sewage networks: one for the evacuation of rain and ground water and the other for domestic and industrial waste.

When speaking about the sewage pipe market in France, we customarily divide the market into two segments:

- o One for large diameter pipes (greater than 400 mm) "collectors" in which reinforced and non-reinforced concrete have a preponderant market share.
- o And the other for small diameter pipes (less than 400mm) in which asbestos-cement still holds a privileged position in comparison to PVC, clay and cast iron.

Estimated Total Sewer Market 10³ A/C Equivalent*

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>Trends</u>
All Diameters	878	895	932	#+1.5%/Year

*Competitor Products: PVC is gaining ground in the small diameter segment to the detriment of asbestos-cement, the market leader.

Breakdown of the Sewage Pipe Market All Diameters*

	<u>1975/1980</u>	<u>1980/1985</u>	<u>Trends</u>
Concrete	45%	48%	→
Clay	£	£	→
Asbestos-Cement	39%	35%	↘
Plastics	6%	12%	↗
Cast Iron	10%	5%	→
Others	£	£	→

(Information Source: Batelle)

*Market shares are calculated using gross figures in KM/Year.

WEST GERMANY

Pressure Pipes

The following chart illustrates the evolution of the German pressure pipe networks from 1965 to 1977.

Inventory of Existing Pressure-Pipe Network

	<u>1965</u>		<u>1977</u>	
	<u>10³ KM</u>	<u>%</u>	<u>10³ KM</u>	<u>%</u>
Cast Iron	97.4	75.3	138.0	60.9
Steel	14.4	11.2	16.0	7.1
Reinforced Concrete	0.3	0.2	0.8	0.3
Asbestos-Cement	10.5	8.1	23.7	10.5
Plastics	6.6	5.1	47.4	20.9
Misc.	<u>0.2</u>	<u>0.1</u>	<u>0.7</u>	<u>0.3</u>
Total	129.4	100.0	226.6	100.0

(Information Source: Wasser Statistik Bundesverband der Deutschen Gas-Und Wasserwirtschaft E.V.)

Contrary to the French situation, the West German pressure pipe market offers a greater potential than the sewage pipe market. This is partially explainable by a lower level of infrastructure: 69% in 1965 and 85% today.

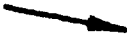
As far as the evolution of the different materials present on the market, we can remark, as in France, a progression of plastic pipes to the detriment of the other materials.

	<u>Real Figures</u> <u>1975/1977</u>	<u>Forecast</u> <u>1977/1985</u>	<u>Trends</u>
Cast Iron	51%	50%	
Steel	1%	1%	
Asbestos-Cement	12%	10%	
Plastics	35%	38%	
Others	<u>1%</u>	<u>1%</u>	
Total	100%	100%	

(Information Source: Batelle)

Sewage Pipe Market

In West Germany the percent of households connected to a public sewage network has nearly reached the saturation point (86% in 1975, 100% in 1981) and the market is becoming essentially a replacement market.

	<u>Market Shares*</u>		<u>Trends</u>
	<u>1975/1980</u>	<u>1980/1985</u>	
Clay	52%	45%	
Concrete	23%	27%	
Asbestos-Cement	13%	10%	
Plastics	10%	17%	
Others	<u>2%</u>	<u>1%</u>	
Total	100%	100%	

(Information Source: Batelle)

*N.B. - The market shares are calculated using figures in KM/Year.

It is important to underline the dominant position held by clay pipes, particularly in the small diameters (100-200 mm). It is primarily in this market segment that plastic pipes are making inroads at the expense of clay pipes.

As for the medium and large diameter segments. They are dominated again by reinforced and non-reinforced concrete.

MAIN CONCLUSIONS AND TRENDS

I. Main expansion period 1960-1974

A. European A/C industry heavily invested in

1. Production
2. Marketing (direct and indirect)

and A/C pipes increased their shares within growing markets.

II. 1975/1980^S - Stagnation - Recession - A/C Reverse Trend

A. Increase of production costs: Cement - Asbestos - Salaries

1. Cement: Linked to energy cost
2. Asbestos: Prices have increased too much during expansion period.
3. Salaries: Indexed directly in practice to inflation rates

- B. Compared to PVC and cast iron, A/C is generally considered as more trouble making with now a reduced competitive edge.
- C. This handicap must be fought by better quality and a more costly technical assistance.
- D. General Problems
 - 1. Pressure Pipes: increase of service pressures in networks:
 - a. higher classes used
 - b. A/C less competitive
 - 2. Sewer Pipes
 - a. A/C is becoming less competitive versus concrete and PVC costwise.
 - b. In spite of increasing oil prices trend of PVC in constant prices is downward.
 - c. Is there an end to this?
 - 3. Saturation of pressure networks
 - 4. Still a potential market for sewage, but the European economic situation leads to less and less public money for such use.
 - 5. 1970^S export market Middle East, Africa ... is shrinking due to local A/C/PVC production since.

MARKET OUTLOOK: GERMANY
by
Robert W. Dorner
Executive Secretary
Association de l'Industrie l'Asbeste-Ciment

BETTER ENVIRONMENT
SAFETY FOR WORKERS
PROTECTION FOR CONSUMERS

PROJECT FOR SEVERE REGULATIONS
COMPULSORY SUBSTITUTION
PHASING-OUT & BAN

PROTEST BY INDUSTRY
INFORMATION CAMPAIGNS

REACTION OF TRADE UNIONS

E P A REPORT

AGITATION IN MASS MEDIA

POLITICAL TOPIC

POLITICAL TRADE-IN
CITIZENS' INITIATIVES
REGIONAL ASBESTOS BANS

MARKET RESISTANCE

CUSTOMERS' APPREHENSION
END-PRODUCT SUBSTITUTION
LOSS OF BUSINESS

"INNOVATION PROGRAM"

of the AC Industry

**REDUCTION OF THE ASBESTOS CONTENT
BY A TOTAL OF 30 - 50 % WITHIN 1982 - 1986**

**-----
IN 1982 REDUCTION BY AN AVERAGE 15 %**

- YEARLY REPORTING TO THE GOVERNMENT
ON THE SUBSTITUTION PROGRESS**
- MAXIMUM PREFABRICATION OF ALL PRODUCTS**
- COATING WHEREVER POSSIBLE**
- DISTRIBUTION THROUGH SPECIALISED TRADE ONLY**
- NO SALES TO DO-IT-YOURSELF MARKET**
- PROPAGATION OF DUST-REDUCING TOOLS**
- LABELLING & HANDLING INSTRUCTIONS**

MARKET OUTLOOK: MEXICO
by
Luis Cejudo Alva
General Manager
Asociacion Mexicana de Fabricantes de Productos
de Asbesto Cemento

Introduction

It hardly seems possible, but yes, another year has gone by. I remember it as though it was yesterday when Joe Jackson asked us to choose a place in Mexico for the Tenth Annual Meeting of the A/C Pipe Producers Association. After careful deliberation we chose this marvelous place, Cancun, which we certainly hope you like and where we are very happy to welcome you.

It is a great honor for me to address such an important and distinguished audience. We always look forward to meeting our good friends year after year; and of course, we always enjoy ourselves very much, this aside from the fact that we keep abreast of what is going on with our A/C pipe industry, the health issues,...and other important matters that are here discussed such as the subject we shall consider today: Market Outlook, and of course, it is my turn to talk about Mexico.

History of Water Works in Mexico

In order to give you a better perspective of what this market consists of in our country, let us start right from the beginning and go back in history to the time when the old Indian settlers founded their towns near the borders of rivers, springs or lake edges. Sometimes they were required to live away from these water sources when they were on the warpath or when under the domain of other tribes; but in any case, they needed water works to either control or conduct water.

In Mexico we have traces of several hydraulic works constructed by the Aztecs, Mayas and other native tribes. Already in the year 1300 there existed in Mexico a great hydraulic development among the Aztecs. They created important waterworks, to mention a few: an aqueduct of 11 kilometers to conduct water to the city of Texcoco, also the Cholula aqueduct which demonstrates great proficiency and ingenuity. The thick walls of this aqueduct are of baked clay and have an interior diameter of 5 feet; it stopped working during the XVI century, but it can still be admired today.

Right here in the Yucatan Peninsula, the Mayas, in order to obtain their water supply, constructed artificial reservoirs where they stored rain water; they also took advantage of natural underground wells and brought water from the rivers through earth or rubblework open channels. They also had systems that were an assembly of hollow tree trunks supported on the ground with wooden or stone wedges.

Later on, when the Spanish arrived in America, they constructed fabulous aqueducts; for example, Zempoala has an aqueduct 45 kilometers in length and with more than 1,000 monumental arches.

During the XVII century, clay pipes were used; and by the XVIII century, the government was convinced of the convenience of supplying the water demand by means of iron pipes.

Great strides were being made, but still it was not enough. Due to the growing population and the distances, the required waterworks were insufficient and people suffered from the scarcity of water. Mexico is a country with many needs and one of the utmost importance is the distribution of potable water. We have plenty of water; but due to its location, it is very expensive to transport it to the consumption centers.

In 1927 when the industrial boom was beginning in Mexico, the first asbestos-cement plant in Latin America was built. The number of companies has been increasing, and today we have twelve plants strategically distributed in our country.

Asbestos-Cement Pipe and Its Competition

During 1947 steel pressure pipe was used in Mexico to conduct liquids, and the competition with asbestos-cement pipe started from 2" diameter upwards. The national market finally tended towards the asbestos-cement pipes; and from then on, the steel pipes have been designed exclusively for the conduction of gas and oil. Government and private consumers have accepted the asbestos-cement pipes to be the ideal conductor of potable water from the point of view of economy, security and yield. All the pipe installations for water lines were made with asbestos-cement pipes produced in classes 5, 7, 10, and 14 kilos/per cm^2 and in diameters ranging from 2" up to 24".

In 1955 the first PVC enterprise was founded. This industry had, at the beginning, serious failures mainly because of the lack of knowledge in the handling and installation of the product, and their prestige dropped until 1964 when five new factories were established. Thanks to standards fixed with the Mexican authorities, European technology, and the integration of the coupling to the pipe, they were able to give the purchaser more security in its use. Soon they started producing pipes of 2", 2.4", and 3" for pressures of 11.2, 8.7 Kgs./ cm^2 (RD-26 and RD 32.51). Due to the spectacular demand for this product between the years of 1964 and 1974, five more plants were established in Mexico with a production capacity of 55,000 tons, out of which 22,000 tons were destined to potable water in the diameters already mentioned.

Graphs

I will now try to give you an idea as clear and vivid as possible with respect to the development of the asbestos-cement pipe market. Then I will analyze the direct competition with PVC, in the smaller diameters 2" to 6". I will follow with pipes from 8" to 24" and proceed with 30" and onward, with its concrete pipe competition. I will also analyze what has happened during the last ten years and finally what we expect, according to the present situation, will happen during this year and in 1983.

I am, therefore, going to proceed to run a series of six slides that will graphically show you what I just mentioned. All graphs are presented in thousands of tons.

Slide 1 - Here, in this graph, we can appreciate the dynamic growth of the asbestos-cement pipes in Mexico, especially during the last year. It is interesting to note how traditionally, every six years when the presidential election takes place, the production declines for at least a year and then it starts again upwards as the government programs get started.

Slide 2 - This graph compares the asbestos-cement market with the PVC in diameters ranging from 2" to 6". In order to make the right comparison we found an equivalent and converted the PVC in terms of asbestos-cement tons.

We chose the years 1970-1974 and 1979 because we felt they are representative of what has been happening in the smaller diameters. In 1970 the asbestos-cement industry had 64% of the market with a total production of 19,900 tons and the "plastic pipes" (as they are commonly called in Mexico) had 36% with a production

of 11,200 tons. In the year 1974, we find these numbers inverted—the asbestos-cement has 36% with a production of 23,310, while the plastic pipes have gone up to 64% with 41,440 tons.

After 1974 the market remains stable, and both products have kept the same market.

Slide 3 - The following graph shows the total market of pipes from 2" to 6". We can appreciate some sudden changes, but these are due basically to government administration changes since most of the pipes are destined for jobs financed by the government. This is the case of December, 1970, and December, 1976. In general terms, we can see how the asbestos-cement pipe industry stabilizes itself, without appreciable growth, and the percentage with PVC remains constant at 65%, irrespective of the market increase, and it is absorbed proportionally.

Slide 4 - In this graph, when analyzing the A/C pipe market from 8" to 24", we first find the same trend as in the graph presented before, during the years of government changes, and then we find sharp increases in the following years. We do not have serious competition in Mexico in these diameters, with the exception of isolated cases in which steel pipe is used.

Slide 5 - As far as A/C pipes of 30" to 36", since 1970 to 1980 the market has behaved as outlined in this graph. Up to now the market of 30" practically belongs to A/C pipes. In larger diameters (36", 41", 71") the A/C pipes have obtained only 10% and the rest has been almost totally for concrete pipes.

Causes of the Devaluation of the Mexican Peso

Within the general development achieved by Mexico, the construction industry has grown in a most dynamic fashion. The economy continued experiencing in 1981 the boom that started in 1977. The most important factors for this development were the high rate experienced on the public expenditure as well as the great investment of the private sector which combined to generate an annual growth of 8.1% of the gross national products. It is important to mention that the construction industry historically had annual growths of 8% and for the past four years it reached 12%. This, of course, was due to the high degree of confidence and collaboration from all sectors that participated in the construction industry with government.

The accelerated growth produced impressive results, creating one million new jobs per year and propelling Mexico to the rank of world's fourth largest oil producer, with an output of 2.7 million bbl. per day. Yet, economic strains began to multiply, the interest rates began increasing and the oil prices began dropping. Mexico surprised the world by decreasing its birth rate, but still has a growing population that shifts towards the large urban centers such as Monterrey, Guadalajara and of course, Mexico City. Inflationary pressures also began to boil up; these and other factors determined a need to devalue the Mexican peso.

Actual Economic Situation

In a macro-economic sense, the major problem that Mexico faces at this time is how to control and reduce the inflation rate without hurting the economic growth out of which comes forth the million extra jobs required yearly. There are several strategies at

the disposal of the Mexican Government to reduce the impact of the devaluation. How to combine different possibilities to obtain the maximum benefits for the country with a minimum of inconveniences is the question before the government economists at this time.

Much has been said of the positive effects that the devaluation will have on exports, and it seems that the tourist sector will also obtain great benefits. It is certain that the current government, as well as the incoming government, will take measures to give strength to its anti-inflation program. One of these measures could be a major control on importation in order to reduce the deficit in the trade balance.

Planning of the Asbestos-Cement Pipe Industry

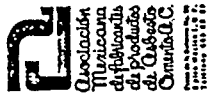
The key to the development of a suitable strategy to cope with the years 1982 and 1983 is to accept reality. In as far as the global economic perspective is concerned, the word is "reality" for the market perspective...reality for financial managerial planning...reality, and above all reality, in planning what can be expected from the government programs. It is expected that one of the measures the government will take is directed towards public investment, which will be used basically to finish the present jobs. There is no hope that any new projects will get started. For the second semester of 1982, there will be a reduction with respect to the growth trend of the last years. The construction of 281 potable water systems will be continued and will benefit 1.6 million more inhabitants. As far as sewer systems, the continuation of 154 systems will widen its service to benefit 1.2 million people more.

Due to two fundamental factors—the devaluation of the peso and the change of the public administration that will occur at the end of this year—the asbestos-cement pipe producers are expecting not so much a reduction in their market participation, but a drop in the overall demand.

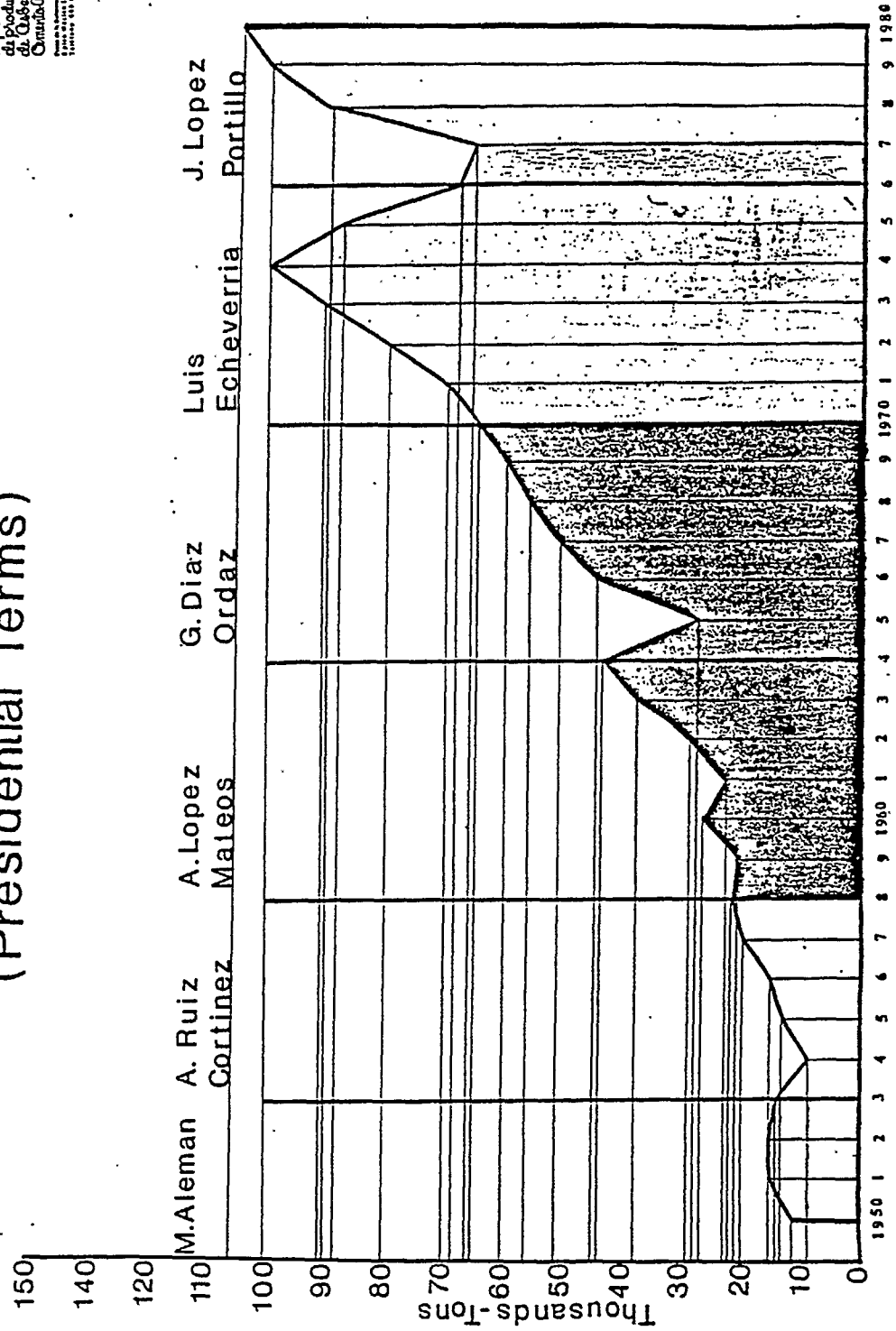
Slide 6 - This last graph demonstrates in a very clear manner that even though last year there was insufficient capacity to supply the demand, it is expected that this year we are going to be 28.5% above the demand; and for 1983, with capacity added the industry will surpass the demand by 40.5%. This gives the A/C producers an additional reason to promote the search for export markets, especially now that the government is about to introduce important incentives to exporters.

In any case, it is to be expected that in future years in order to give priority to the basic needs of our country and to the process of modernization, the demand will require larger and larger investments from the A/C pipe producers.

Blessed as it is, with an abundance of natural resources and an eagerness to exploit them for the common benefit, Mexico has a bright economic future; but much will depend on the measures that are put into effect in order to restore prosperity. Our industry is conscious of its responsibility and the need to preserve the proper spirit that will permit it to face the challenge of the future.



Growth of a/c Pipe Industry (Presidential Terms)



MARKET DEVELOPEMENT

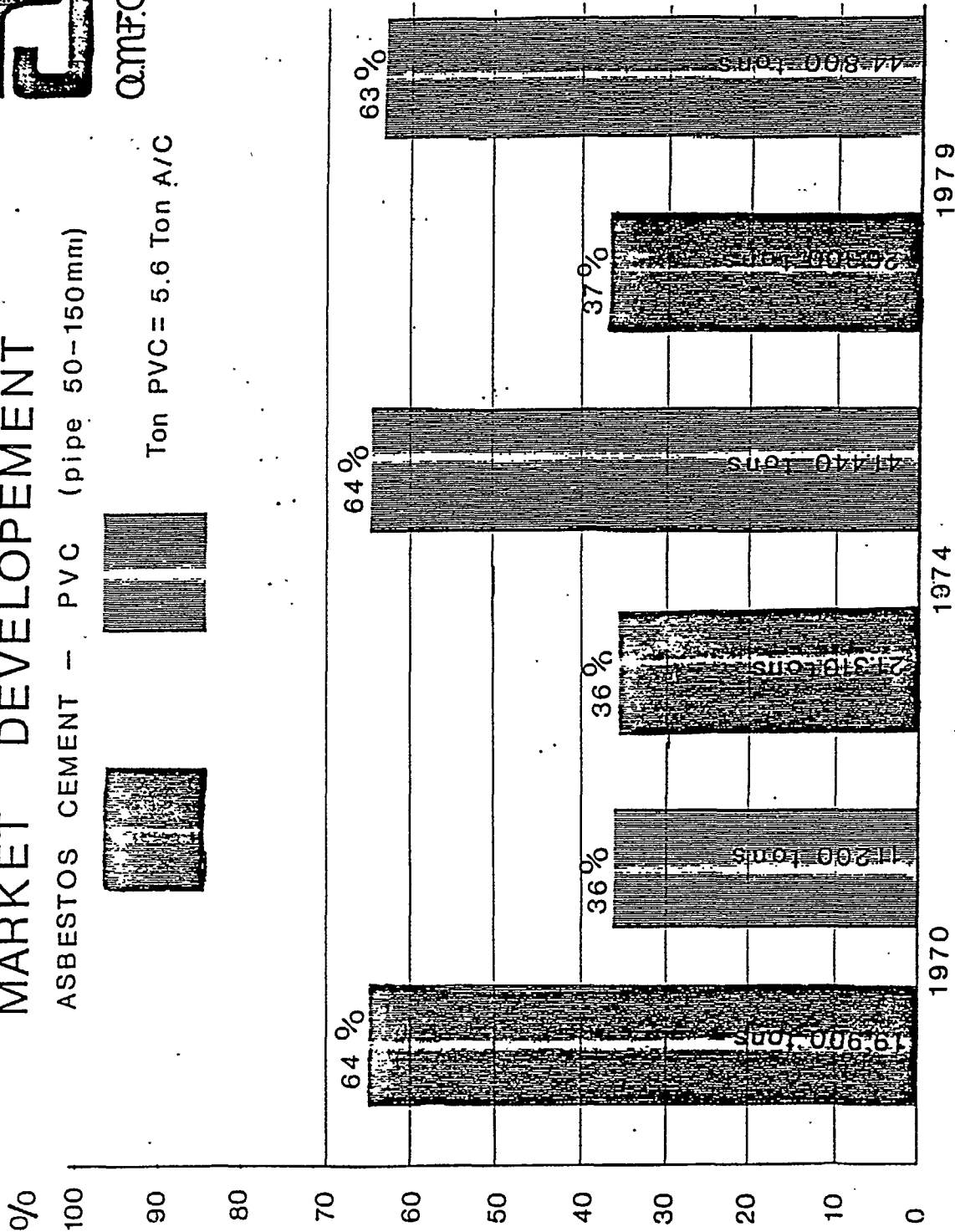
ASBESTOS CEMENT - PVC (pipe 50-150mm)



Ton PVC = 5.6 Ton A/C



QMFQC



PIPE MARKET

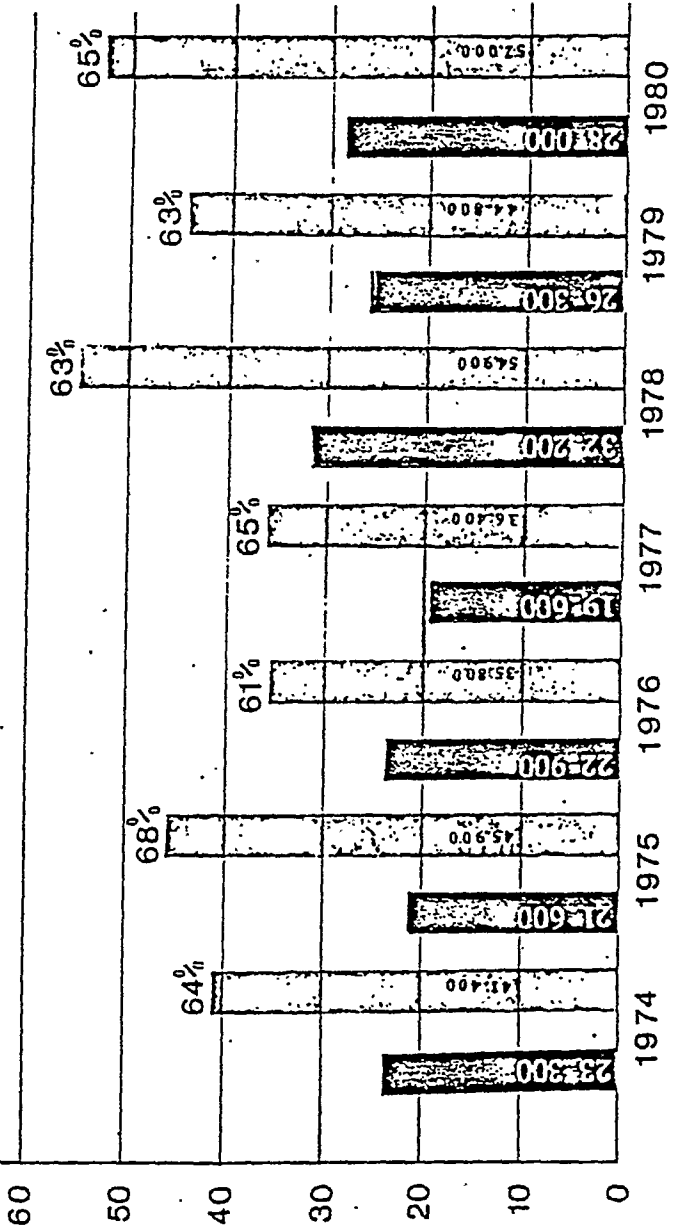
(50 150 mm)

APPROPRIATE CEMENT PVC

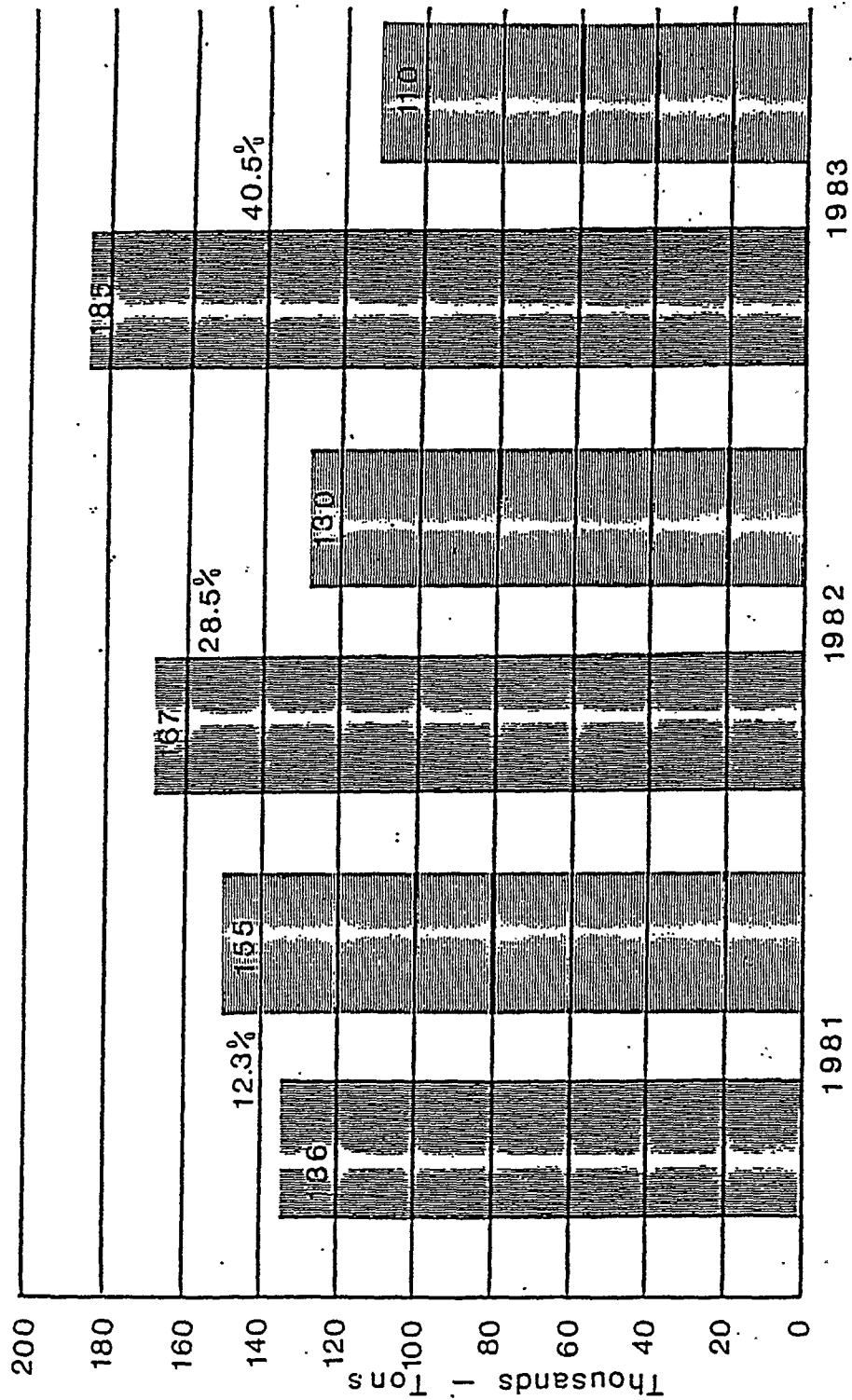


AMF.O.C.

Thousands - Tons

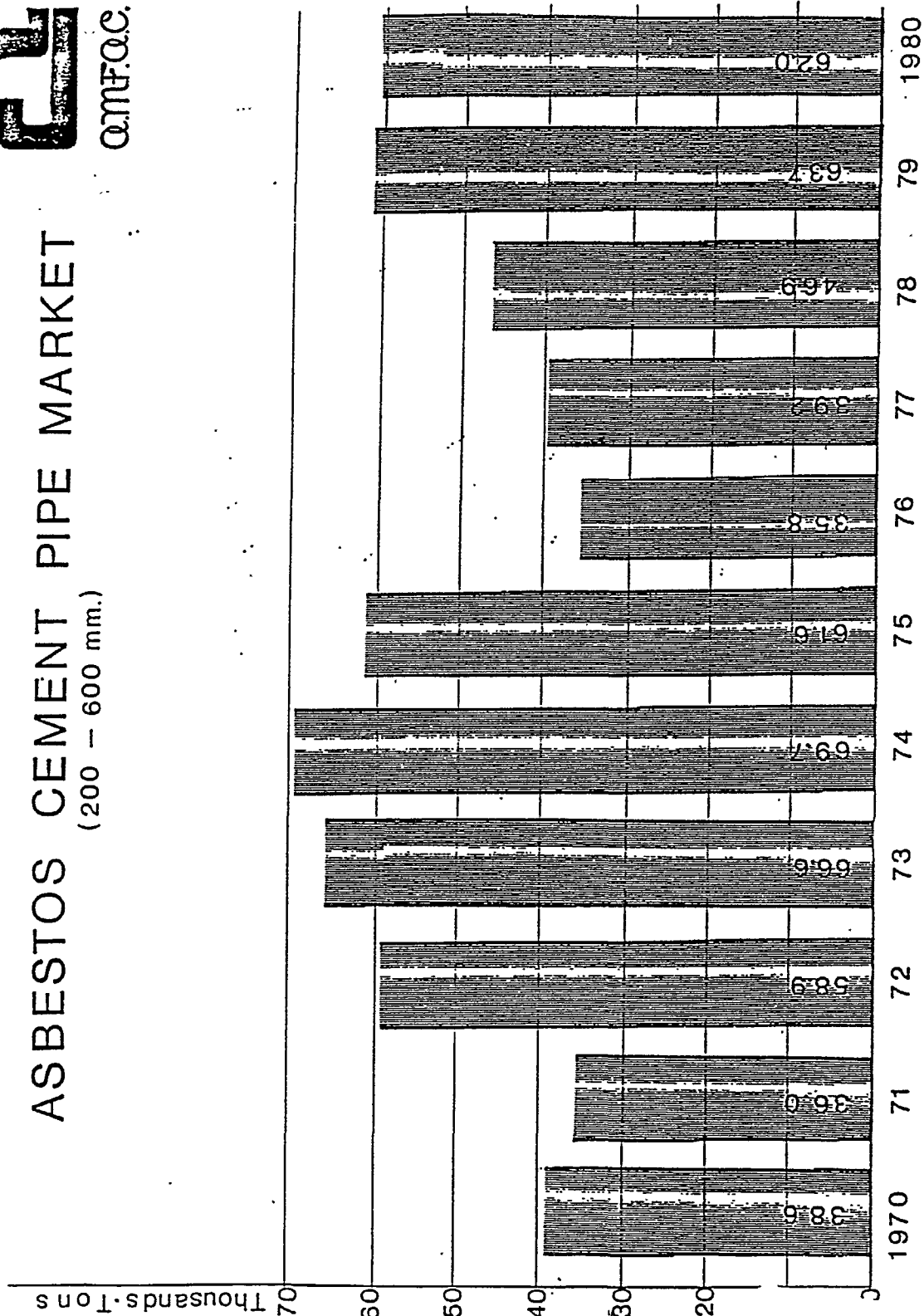


Capacity } Asbestos Cement Pipe
Demand





ASBESTOS CEMENT PIPE MARKET (200 - 600 mm.)



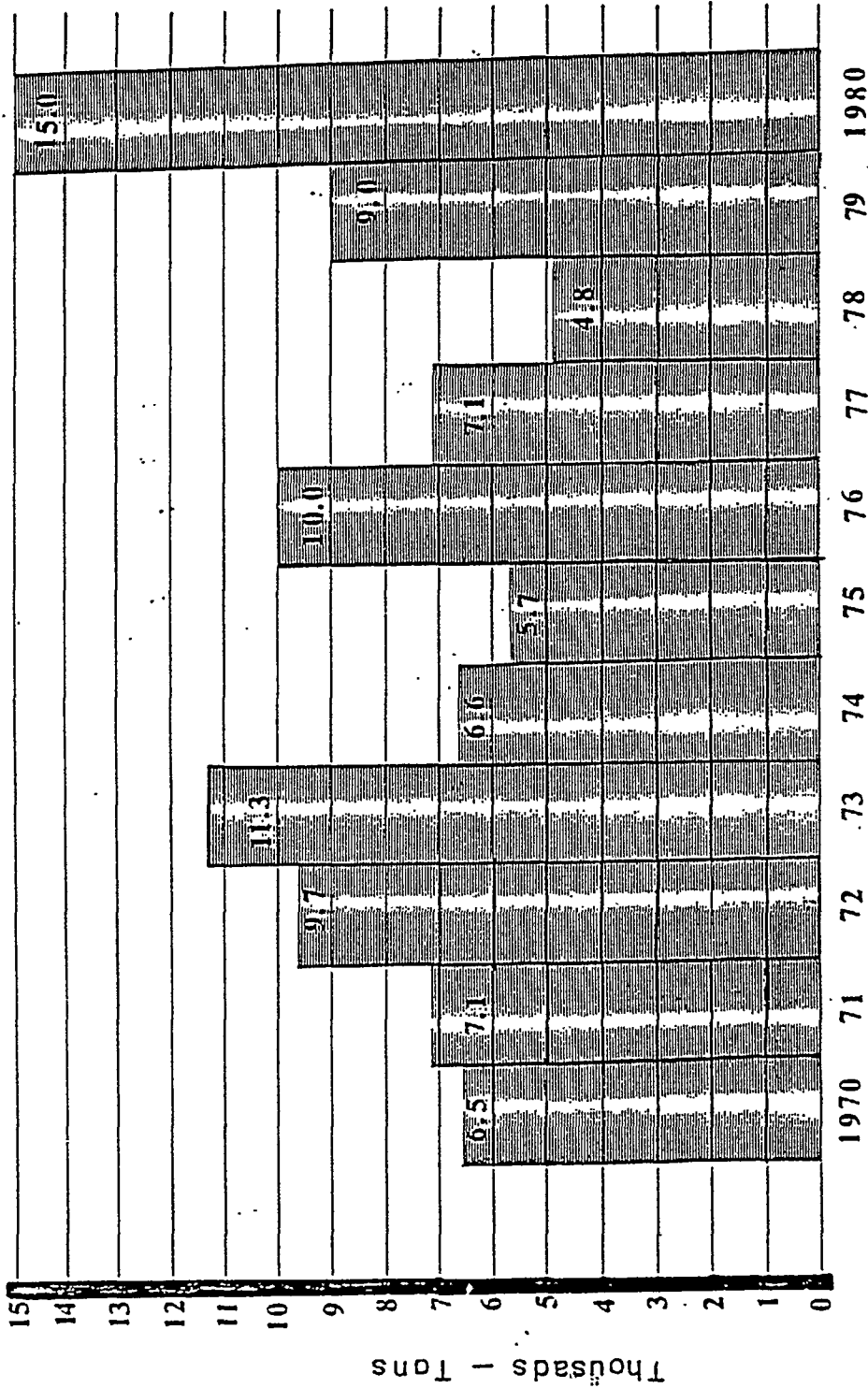
SLIDE 5



Asbestos Cement Pipe Market

A.C.P.M.

(750 - 900 mm.)



SLIDE 6

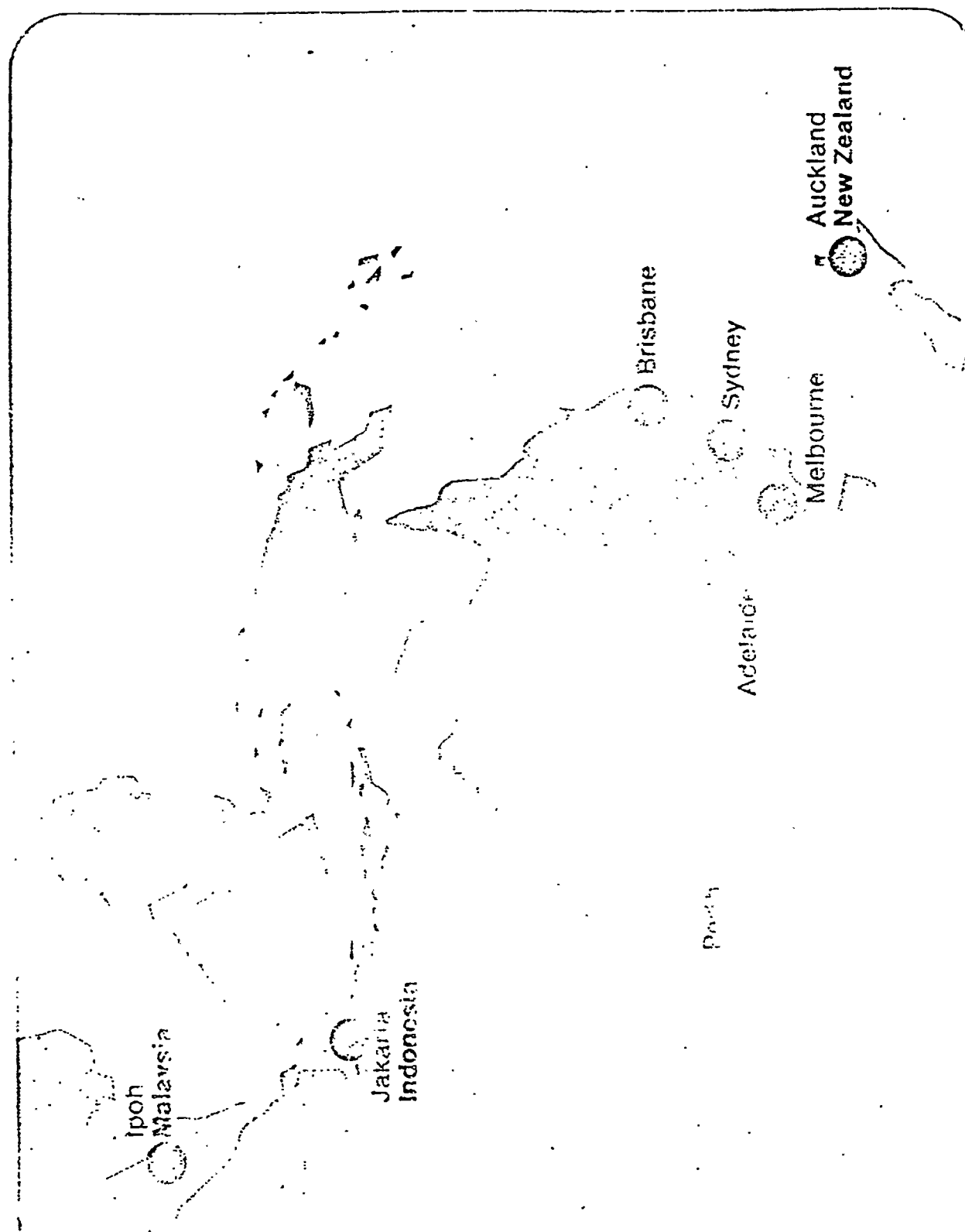
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MARKET OUTLOOK: FAR EAST

by

Harry A. Hudson
Executive General Manager
James Hardie & Company, Ltd.



The areas of operation that will be covered in this session will include Australia, New Zealand, Malaysia and Indonesia.

Neglecting the effects of the "health issue", the factors that are significantly determining the level of A/C pipe requirements in 1982/1983 will be mentioned for each area of operation.

Before you decide to move your A/C plants and join us, please realize that the graph of total demand (Figure 1) does not show:

1. the individual demands of the various countries. We will examine these individual demands in more detail, and you will see the differences between the trends in developed and underdeveloped countries.
2. the reduced margins in the developed countries because of intense competition.
3. the change in composition, where previously the high volume of pressure pipe at good margins is being replaced by a large volume of drain pipe at very low margins.

AUSTRALIA

Australia is a developed country with a population of almost 15 million people. Population growth is minimal.

James Hardie & Co. have A/C pipe plants installed in five capital cities. A total of seven Mazza machines have been installed.

The demand for A/C pipe over the last five years (Figure 2) has been a little variable. Future demand indicates that some growth can be anticipated following a slight decline in the next two years. The most significant factors which have influenced and which will influence the volume of A/C pipes sold in Australia are:

1. Level of Government Spending

During recent years Government spending in all areas--Federal, State, Local--has been severely curtailed. This factor, more than any other, determines the level of activity in our business. I would not anticipate any significant increase in this area in the near future.

2. Resource Development

Previous projections on resource development were a little optimistic, and the prediction of a resource development boom has not eventuated. Time will ensure, however, that developments in this sector will eventually occur with massive expenditure in the following areas:

Minerals
Coal
North West Shelf Development

World prices and demand will determine the speed of this development.

3. Competition

Intense competition is evident in all States of Australia in the following areas:

P.V.C. up to 300 mm diameters
Ductile iron 300 mm and above
Steel in large diameters

4. Housing Industry

The housing industry has experienced a depressed period over recent years because of lack of available finance and more recently higher interest rates. Housing starts were down 10% last year. The Australian economy has now levelled out; and whilst the economy is not booming, it is not getting worse. Improvement can be anticipated.

NEW ZEALAND

New Zealand is also a developed country with a population of some 3 million people and declining. High inflation rates of 16% are being experienced.

The economy of New Zealand is in a very depressed state, and the country is experiencing a very adverse balance of payments period. The country is almost entirely dependent on rural and agricultural exports.

Experience over the last five years (Figure 3) has recorded a slow but progressive decline in A/C pipe requirements. Slight growth is predicted in the foreseeable future.

Current level of demand is due entirely to the state of the economy and competition from PVC in the small diameters. Future production levels will be determined by the following:

1. C.E.R.

The success of this venture is of paramount importance to New Zealand. C.E.R. stands for Closer Economic Relations. The Governments of Australia and New Zealand are cooperating to improve the level of trade between the two countries. Increase in demand for goods from New Zealand will ensure faster development in that country.

2. Export Incentives

Export incentives introduced by the Government heavily subsidize the cost of exports from New Zealand. The continuation and improvement in these incentives could ensure that the export of A/C pipes from New Zealand could increase. The Government is determined to maximize export earnings.

3. Planned projects to reduce the dependence of New Zealand on oil imports will require massive expenditure and will result in a heavy demand for piping.

MALAYSIA

Malaysia is a developing country with a population of 14.5 million people and an increase in population of 2.8% per annum.

Any comments offered on the level of demand (Figure 4) refer to U.A.C. alone. Competitors in A/C pipe manufacture do exist in Malaysia. Demand for pipe has been strong. The volume supplied by U.A.C. represent the total output of installed capacity. 1979 saw the commissioning of a new Mazza machine.

Projections for 1982/1983 will be determined by the following:

1. Liquidity

A tight liquidity situation has developed which is affecting Government and Private Sector spending. A slight recession is apparent which is affecting industries with high exposure to export markets.

2. Export Earnings

Depressed world prices and demand for Palm Oil, Rubber and Tin and Oil has created an adverse balance of payments situation.

3. Fourth Malaysian Plan

The success of the Fourth Malaysian Plan for the continued development of the country is of vital importance. With an improvement of export earnings and the Government's determination in this regard, the success of the plan is assured following the re-election of the government and assuming that stable government continues.

4. Competition

As with all countries, the existence of PVC pipe is being realized. Four major PVC manufacturers have commenced to erode the demand for pipes in the small diameter range.

INDONESIA

Indonesia is also a rapidly developing country where a firm stable Government has been in power for some time. The population is conservatively estimated at 147 million and is expected to increase to 200 million or above by the end of the century. Strong demand can be anticipated.

Our company has one Mazza machine installed, and I would expect that other permits for Mazza machine installations will occur.

The country possesses strong foreign exchange reserves which are important and essential for future growth. Local economy is dependent almost entirely on world oil prices and the reduced necessity to import rice because of improvements in the domestic rice harvest.

Sixteen PVC pipe manufacturers are producing pipe up to 4" in diameter.

Demand for A/C pipe (Figure 5) is currently determined by:

1. Government Policy

A continuation of Government policy to provide funds for the supply of water for the population's needs. Many cities are in need of water supply. The demand does fluctuate violently as it is dependent also on the ability of the engineering department to install the volume of pipes purchased.

2. Foreign Aid

The degree of foreign aid is also a vital determinant in the demand situation. The world economy and the policies of countries supplying foreign aid will be important in the future.

3. Stable Government

The result of the Presidential elections is a foregone conclusion. President Suhato will be elected. A more important consideration is Suhato's successor and his ability to ensure that a stable government continues to function.

Ladies and gentlemen, this has been a brief outline on what I consider to be the most important factors affecting the demand for A/C pipes in 1982/1983 and for the immediate future.

Thank you for your attention.

FIGURE 1

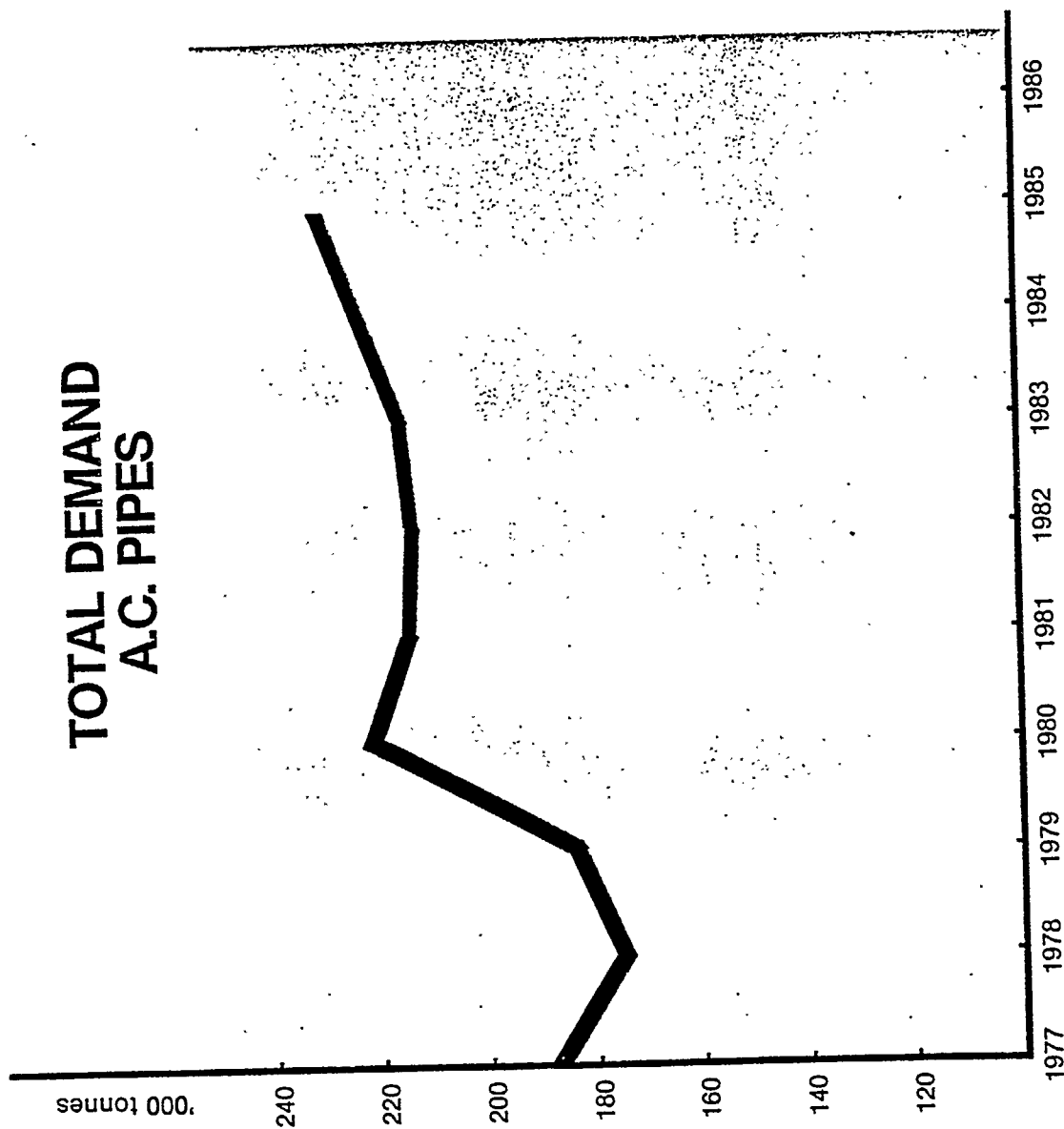


FIGURE 2

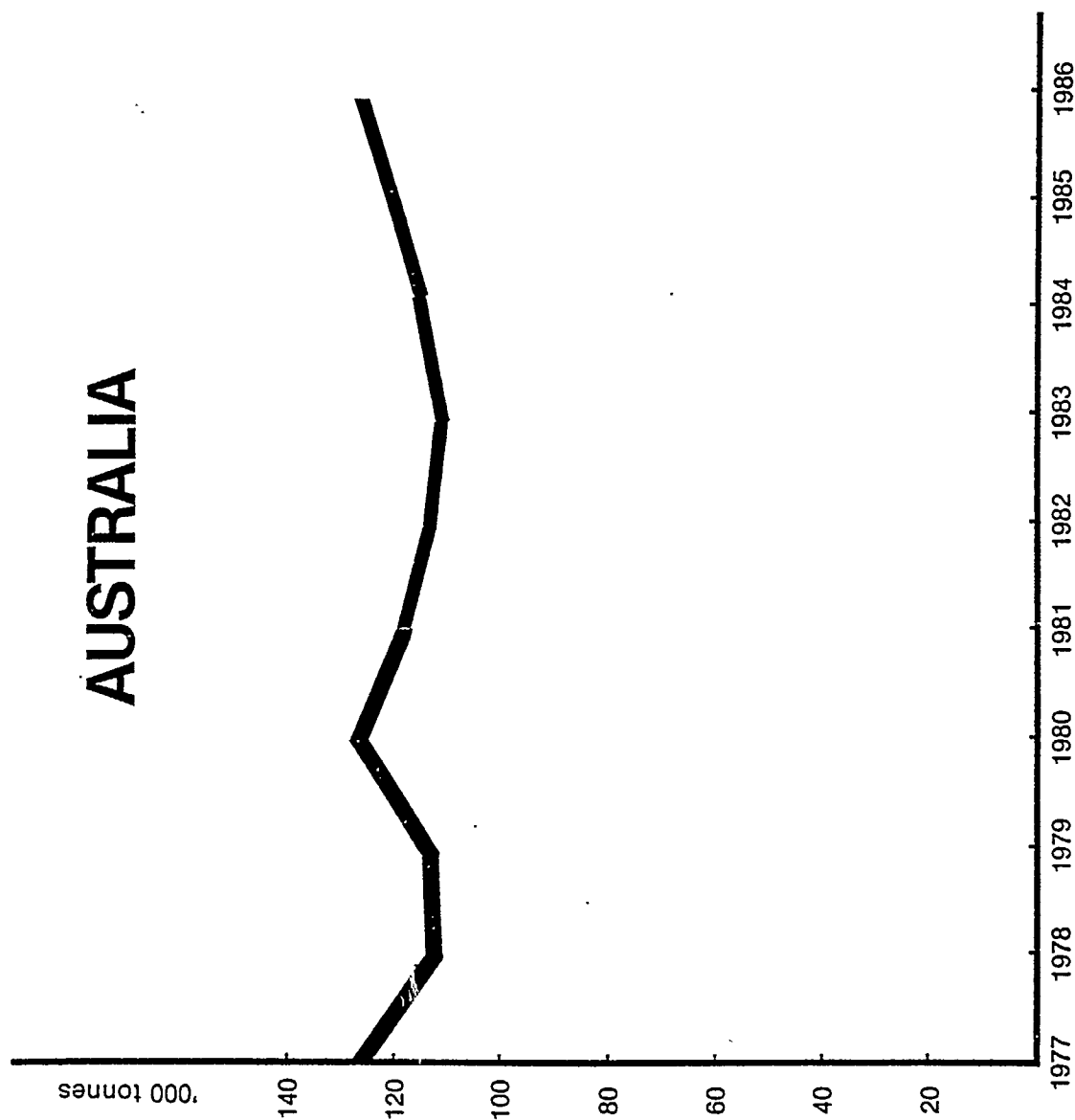


FIGURE 3

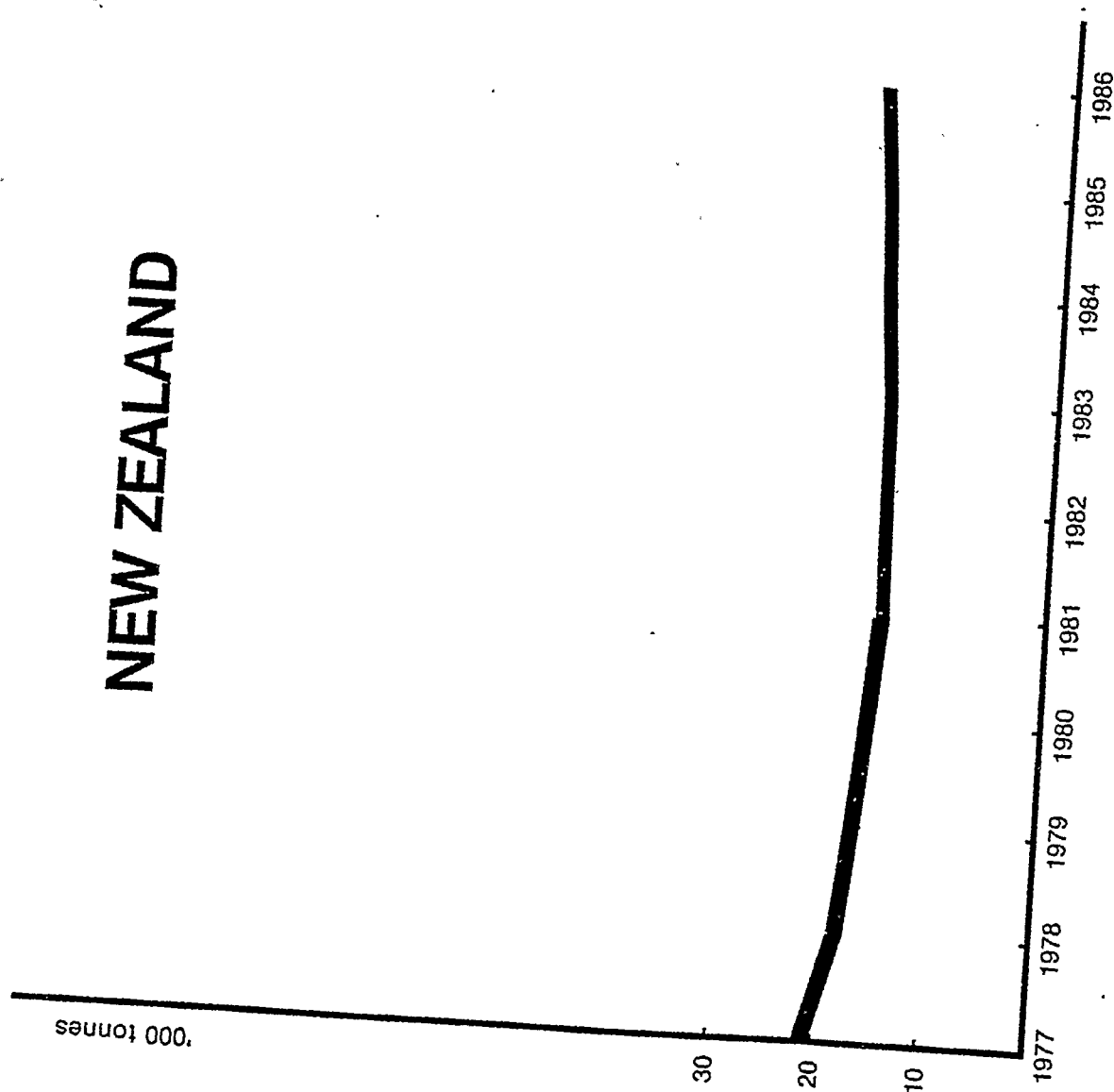


FIGURE 4

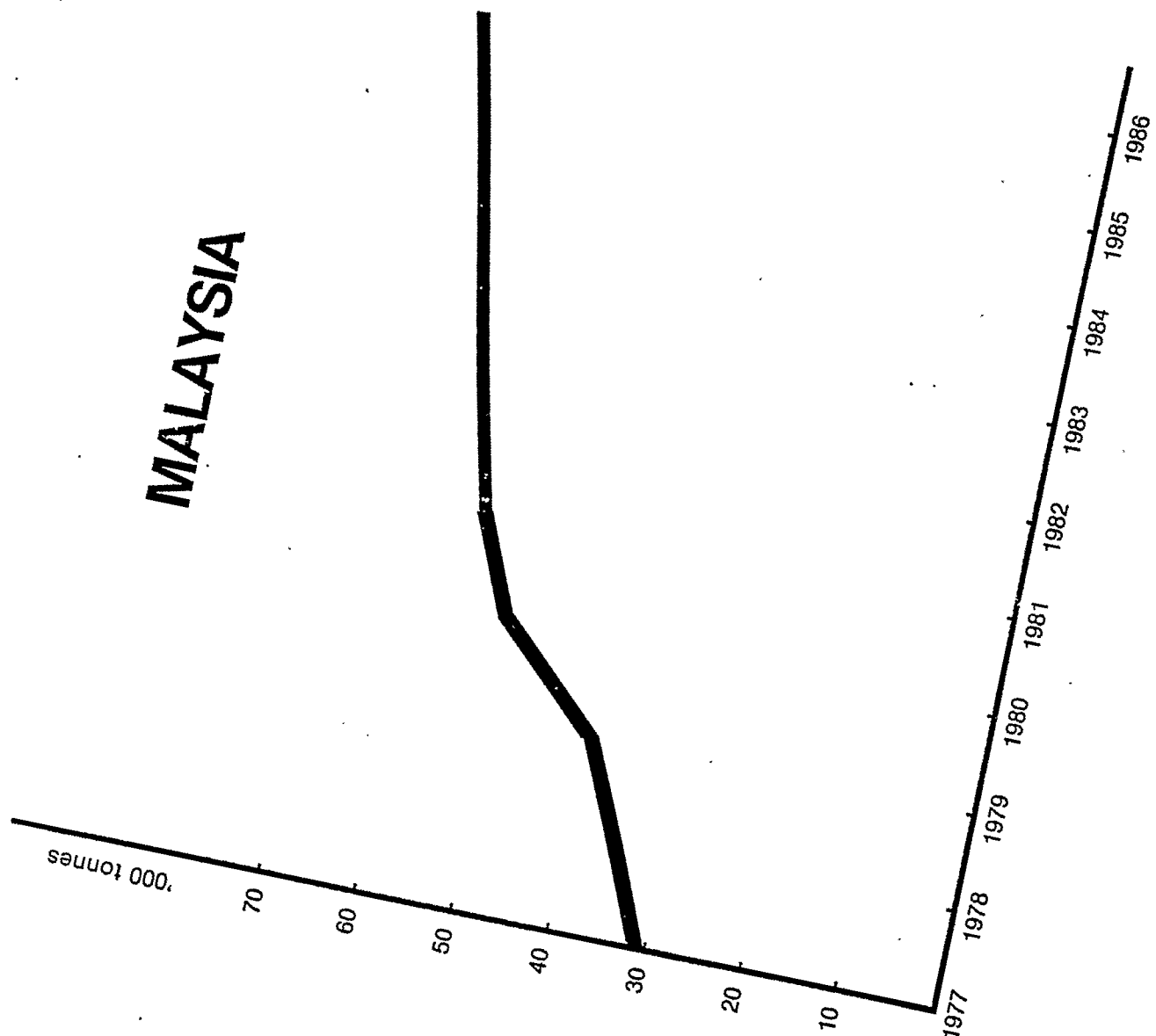
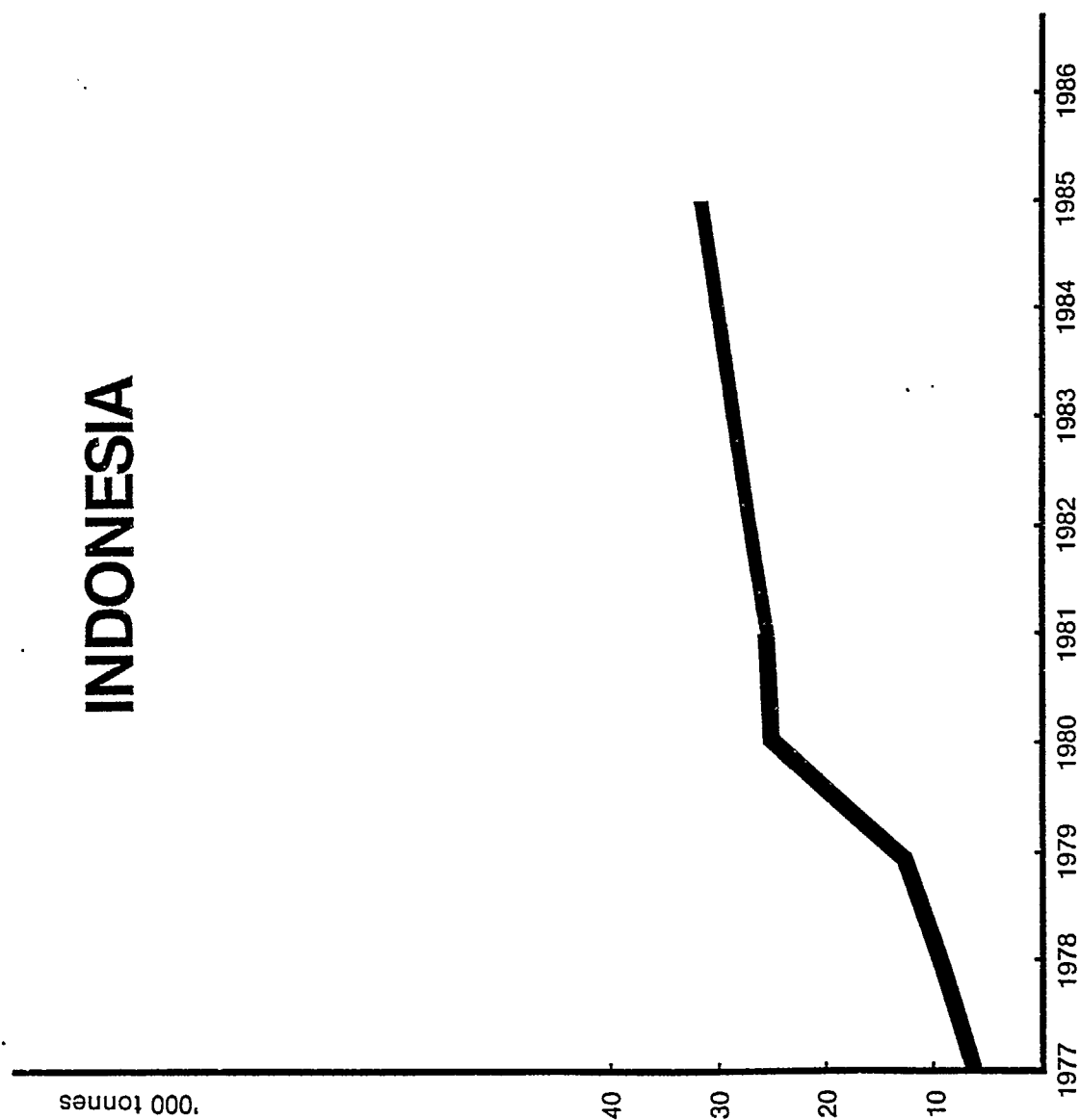


FIGURE 5



REGULATORY OUTLOOK: U.S.

by

John F. Welch

Vice President

A/C Pipe Producers Association

The regulatory and legislative outlook for 1982 is a "good news-bad news" story. The "good news" is that there is no news. The likelihood of additional or more stringent regulation of the A/C pipe industry appears to be very small. The "bad news" also is that there is no news. The likelihood of negotiated regulations with the U.S. Environmental Protection Agency (EPA) or the Occupational Safety and Health Administration (OSHA) also appear to be very small.

This unusual situation leaves the industry in a regulatory limbo—a limbo where the prospect of new regulation and accompanying economic impacts are unknown—in a limbo where, with the passage of time, the so-called "window of opportunity" is slowly closing for negotiating a regulatory scheme mutually acceptable to EPA, OSHA and the asbestos industry.

The "good and bad" of this situation are obvious. The "good": regulation does not get any worse, asbestos and A/C pipe are not the focal point of government research and are not bandied about so much in the media.

The "bad?" The A/C pipe industry, indeed the entire asbestos industry, lingers under a specter of regulation that continues to erode product loyalty inside and outside the industry, as well as maintaining general public concerns about A/C pipe. Worse, the uncertain outcome of any regulatory negotiations creates a critical information void in the corporate planning and decision-making process.

Let's take a more detailed look at the two principal actors—EPA and OSHA.

Occupational Safety and Health Administration

It is hard to believe that the proposal to lower the occupational exposure limits of asbestos to 0.2 fibers/cc TWA is nearly 6 years old. OSHA has made no substantial progress in that rulemaking, in spite of the fact that NIOSH recommended that the standard go as low as 0.1 fibers/cc. Now understand that no progress was made on the proposed standard under two administrations with rather liberal leanings towards occupational health matters. Imagine the prospects then for progress under a conservative administration staunchly opposed to most regulations.

Although asbestos regulations are not high on the priority list at OSHA, about two months ago Kirkland and Ellis prepared for an OSHA contractor an "options paper" for actions on asbestos. Kirkland and Ellis recommended that OSHA reaffirm the 2.0 fiber/cc standard for the asbestos product manufacturing industries. The basis for this recommendation was that exposure levels in most asbestos manufacturing industries already are below 1.0 fibers/cc and often below 0.5 fibers/cc. In order to meet a 2 fiber/cc standard, levels below 0.5 fibers/cc must be achieved in any event. Special counsel maintained that reduction to a 0.5 or 0.1 fiber/cc level, even if feasible, would result in little actual exposure reduction. Thus, OSHA cannot justify reducing the standard on the basis of either risk reduction or feasibility or cost effectiveness.

Kirkland and Ellis' second recommendation was that OSHA begin a regulatory proceeding to issue a standard to lower asbestos exposures in the construction industry. The position paper stated that this is a problem crying out for special treatment because the current standard is not being...and cannot be...enforced. Moreover, it would be a classic example of how a scheme of work practices and minor technological innovations could produce a cost-effective health standard that comports with President Reagan's political philosophy and the Supreme Court rulings on OSHA decisions.

The situation was stagnant until the week before last when OSHA officials and industry representatives met to discuss the drafting of an advanced notice of proposed rulemaking (ANPRM), the first step in the standards-making process. In what must be a first in industry dealings with that agency, OSHA officials actually sought out the industry's position on a future asbestos standard. This is a far cry from that infamous weekend in 1976 when two OSHA officials sat down with Dr. Selikoff and his co-workers at Mount Sinai School of Medicine and asked what they would like to see in an asbestos standard. The position paper just discussed represents the substance of those recent OSHA discussions. We also understand that there were some exploratory conversations about moving the asbestos standard down to 1.0 fibers/cc TWA.

The probability of obtaining a separate asbestos standard for construction appears to be good. Such an approach was recommended by the previous OSHA administration. Also, the current OSHA administration comes from the construction industry and is sensitive to its issues.

Even if an ANPRM were to be published, substantive action is many months away. It would take 2-3 months to prepare the ANPRM in OSHA, 2 months for it to be approved in the Office of Management and Budget, 2-3 months for public comment and hearings, 6 months for digesting comments and preparing a proposed rule, and 2 more months reviewing the proposed rule in OMB. Under this time schedule, we are approximately 16 months away from even a proposed rule. A similar timetable would apply for issuance of a final standard.

The summary with respect to OSHA, then, is as follows. Progress within this agency historically has been slow and is likely to remain that way. The Ontario Royal Commission Hearings and the World Symposium on Asbestos may provide new input to OSHA's thinking but it is unlikely that anything significant will occur until late 1982 or 1983.

U.S. Environmental Protection Agency

If my memory serves me correctly, the asbestos rulemaking was the first initiated under the Toxic Substances Control Act (TSCA). At the 1981 Annual Meeting, the Director of the Chemical Control Division of the Office of Toxic Substances announced that EPA would cooperate with industry in preparing reasonable regulation...that EPA did not want to bankrupt the asbestos industry.

A year later it can be said that there have been numerous EPA-industry discussions regarding "negotiated regulations" but little tangible progress. The major substance of these discussions has been in two areas:

- o Responding to EPA's questions regarding current asbestos exposure levels and control technology in the asbestos manufacturing industry and construction industry.
- o Moving forward with the regulatory control option of labeling asbestos-containing products.

The timetable for these "negotiated regulations" is also uncertain. The Agency is being pressured by Congress and the media on all asbestos matters, particularly its plans for dealing with asbestos materials in schools. Revisions to the Clean Air Act, reauthorization of the Safe Drinking Water Act, funding for the Clean Water Act and

lead phase-down rules for gasoline will be higher on the EPA priority list. For reasons unknown, the asbestos rulemaking does not appear to be a priority item. The most tangible progress to date is the EPA-OSHA agreement to coordinate any rulemakings for asbestos. While this may be good management policy, inter-agency coordination means time delays squared.

If and when TSCA proceedings get underway, the industry's state of preparation is excellent. AACPP is presently circulating for comment within the A/C pipe industry "position papers" on asbestos exposures and current control technology in manufacturing and construction workplaces. This is a compilation of the data from the Arthur D. Little Company survey of the asbestos manufacturing industries. Dr. Kenny Crump has finished an excellent analysis of the Kanarek et al studies. It is hoped that this will be quite valuable in defending against any arguments that ingested asbestos is a health hazard. The economic impact assessment of a ban on A/C pipe in the United States, completed in December, 1980, is on the verge of being outdated by the economy and plant closings. Nonetheless, it is expected to be of value in the defense proceedings.

In summary, even if one assumes a worst case scenario, i.e. that the negotiated regulations will not move forward, the A/C pipe industry has a well-prepared affirmative case on its behalf.

EPA Office of Drinking Water

The Safe Drinking Water Act is another statute under which A/C pipe might be regulated. At this point in history I will stick my neck out and say that it is very, very unlikely that EPA ever will promulgate a maximum contaminant level for asbestos and drinking water. Since 1980, scientific evidence on the ingested asbestos issue has been mounting strongly in support of industry's position.

The National Institute of Environmental Health Science's animal feeding studies are due late in 1982. Most of you should be familiar with the results of the hamster phase. Preliminary reports on the rat phase indicate no difference in the number or type of tumors in treated versus control animals. The NIEHS studies corroborate a number of other recent animal studies (Smith, 1980; Hilding, 1981; Pigott; Bolton).

Likewise, epidemiologic studies have failed to demonstrate any hazard from the ingestion of asbestos. The continuing studies in Duluth, Minnesota (Sigurdson, 1981) still do not show any link between ingested asbestos and cancer. It is understood that EPA either cannot or will not fund this research any longer. In the Puget Sound region of Washington State, Polissar will publish this year his results showing no increased gastrointestinal cancer in exposed populations. Polissar's case control study, which involves consistent asbestos exposures to greater than 200 million fibers/liter, is also due in late 1982.

An EPA study of an A/C pipe system in Pensacola, Florida, has shown no differences in cancer incidence in people exposed to high and medium levels of asbestos and drinking water. And, of course, late in 1981, Peter Toft of Health and Welfare Canada republished that agency's census tract study. The result again demonstrate no increased disease incidence in populations exposed to high levels of asbestos and drinking water.

It is interesting to note that EPA recently sent out a "request for quotation" for conducting a re-analysis of the Kanarek study to see if population density explains the results as postulated by Dr. J. Waster, Meigs and in Higgins.

All EPA-funded epidemiologic studies were sent to the University of Pittsburgh for peer review. It is likely that this peer review process will be one part of the agency's overall review of the asbestos and drinking water data. In a similar vein, the National Academy of Sciences review of the medical literature on ingested asbestos appears to be on schedule for issuance in 1983.

A point of maximum return has been reached with asbestos and drinking water research. Nearly all the EPA studies, with the exception of the Kanarek study, come down on the side of industry's position. EPA has no reasonable basis to issue a maximum contaminant level for asbestos in drinking water or to impose mandatory control measures for the use of A/C pipe in potable water systems. In spite of this rather overwhelming evidence, it is not likely that the agency will issue an affirmative statement on the safety of A/C pipe. It is likely that EPA will continue to allow its use with the formal/informal recommendation that highly aggressive water be stabilized to minimize a potential release of asbestos fibers and exposure to consumers. This will be done on the grounds that it is an approach consistent with sound public health philosophy of minimizing exposure of carcinogens.

The regulatory outlook in the European Economic Community and Germany should give us some pause for concern. Industry should not forget that, as it did in the early 1970's, there is clearly the potential for European standards being the model for U.S. standards rather than vice versa. Moreover, we should never lose sight of the fact that the asbestos industry is politically weak. It would be an easily lead "sacrificial lamb" if the Reagan Administration found it politically expedient to more strictly regulate the industry for political gain in advance of the next presidential elections.

MUNICIPAL ANALYSIS PROGRAM

by

G. Wade Miller

Consultant

Wade Miller Associates, Inc.

- I. Study Objectives
 - A. To document the performance of A/C pipe.
 - B. To develop a comprehensive data base on A/C pipe use.
 - C. To compare A/C and competitive construction materials wherever possible.
 - D. To identify research needs.
- II. Types of Information Solicited
 - A. Operational
 - 1. Specification, decisionmaking and procurement.
 - 2. Installation and testing.
 - 3. Operation and maintenance.
 - 4. Detection and prevention.
 - 5. Repair and replacement.
 - B. Institutional
 - C. Financial
- III. Measurement of Performance Against Objectives
 - A. We did
 - 1. Gain substantial insight into how and why decisions are made.
 - 2. Discern market trends in the ten cities.
 - 3. Obtain good mainbreak and competitive pricing data.
 - 4. Learn a lot about the competition.
 - B. We did not
 - 1. Obtain detailed performance data specific to A/C pipe such as pumping costs or C-factors.

THE TEN CITIES

CITY OR UTILITY	POPULATION SERVED	T&D SYSTEM (MILES)		
		TOTAL	A/C	% A/C
HOUSTON	1,400,000	4517	1242	27.5
EBMUD	1,125,000	3449	1060	30.7
PHOENIX	900,000	4275	3300 EST.	77.2
SAN DIEGO	800,000	2136	1390	65.1
SAN ANTONIO	690,000	2698	1551	57.5
EL PASO	425,000	1602	1100	68.7
SAN GABRIEL VALLEY	210,000	823	437	53.1
PUEBLO	109,000	377	131 EST.	34.7
ABILENE	102,000	660	250	37.9
HAYWARD	96,000	335	275	82.1

IV. Purchasing Decisionmakers

A. System Director

1. Abilene
2. El Paso
3. San Antonio
4. San Gabriel

B. Committee (Engineering, Operations)

1. EBMUD
2. Pueblo
3. Houston

C. Engineering Personnel

1. San Diego
2. Phoenix
3. Hayward

V. Reasons for Purchasing A/C

- A. "It is the least expensive pipe that meets performance standards."
- B. Corrosion resistance
- C. Ease of installation

SPECIFICATION AND PURCHASE

<u>CITY</u>	<u>SIZES PURCHASED</u>	<u>CLASS OF PIPE</u>	<u>PRIMARY DESIGN CONSIDERATIONS</u>
HOUSTON	4-16	150 (8-16) 200 (4-6)	SOIL CONDITIONS
EBMUD	6,8 ONLY	150	SOIL CONDITIONS, SEISMIC FAULTS
PHOENIX	6-12, SOME 16,4	150 EXCEPT IN MOA'S	LOAD, SOILS, HYDRAULIC CAPACITY
SAN DIEGO	4-16, SOME 20-30	150 (UNDER 170 PSI) 200 (MORE THAN 200 PSI)	STANDARD SPECS, EXPERIENCE WITH OTHER PIPE
SAN ANTONIO	4-16	200 (6-8 INCH) 150 (LARGER SIZES)	SOIL CONDITIONS
EL PASO	4-12	200	SOIL CONDITIONS
SAN GABRIEL	4-16	150 (SOME 200 IN HP AREAS)	BEAM STRENGTH IN HILLY AREAS
PUEBLO	4-20	150	SOIL CONDITIONS
ABILENE	6-16	150	SOIL CONDITIONS
HAYWARD	6-12, SOME 16	150	FIRE FLOW, SOIL CONDITIONS

TOTAL INSTALLATIONS - 1981

<u>CITY</u>	<u>MILES A/C INSTALLED</u>	<u>FEET</u>
HOUSTON	120.5	636,293
EBMUD	26.4	139,424
PHOENIX	98.3	518,812
SAN DIEGO	50.1	264,613
SAN ANTONIO	145.9 (1980)	770,100
EL PASO	32.6	172,148
SAN GABRIEL VALLEY	16.1	84,994
PUEBLO	11.1	58,600
ABILENE	4.63	24,443
HAYWARD	1.54	8,127

VI. Installation and Testing

- A. Developers and contractors install the majority of pipe in each of the ten cities; only EBMUD and Pueblo City forces install as much as 30 percent.
- B. Depth of cover ranges from 30-60 inches with most systems in the 36-48 inch range.
- C. Bedding practices depend entirely on soil conditions; most systems follow manufacturer recommendations; San Antonio and Houston require a 4-6 inch sand envelope.
- D. Sand, aggregate, or gravel is used as backfill material in eight of ten systems.
- E. Two cities (Abilene, Pueblo) do not hydrostatically test new mains; testing requirements range from 125 psi - 8 hours to 225 psi; no two cities had the same specification.
- F. Installation costs in larger utilities are averaging \$31.17 for 6-inch, \$35.50 for 8-inch, and \$37.50 for 12-inch; smaller city installation costs are about half this amount.
- G. Six of ten systems are familiar with and use recommended work practices.

MAIN BREAKS (1981)

CITY	TOTAL BREAKS	A/C	% A/C	CI	% CI	BREAKS/ 100 MILES
HOUSTON	7977	293	3.7	5251	65.9	176.6
EBMUD (1980)	714	156	21.8	468	65.6	20.7
PHOENIX	2000 EST.	-	<10	-	27 EST.	46.8
SAN DIEGO	282	65	23.1	199	70.6	13.2
SAN ANTONIO (11 MO.)	1019	338	33.2	679	66.6	41.2
EL PASO	277	35	12.6	192	69.3	17.0
SAN GABRIEL	12	-	-	-	-	1.5
PUEBLO	126	17	13.5	84	66.7	33.4
ABILENE	677	-	5 EST.	MOST	-	102.6
HAYWARD	28	-	-	-	-	8.3
AVERAGE	1311	151	15.3	1146	67.4	46.1

VII. Main Breaks

A. Causes cited most often

1. Contractor error
2. Poor installation
3. Expansion/Contraction
4. Excessive water pressure
5. Shifting soils

B. Nature of breaks

1. Beam breaks, mostly in 4-inch
2. Leaking or rusted repair clamps
3. Circle breaks caused by settlement
4. Hairline cracks
5. Split couplings

C. Seasonality

1. Most breaks occur during extended dry periods, after extended wet periods, or before/after a freeze/thaw.

VIII. Repair Policies and Costs

- A. Most A/C repairs are made with leak clamps.
- B. The repair policy typically is to repair A/C with A/C, but to use PVC C-900 for cast iron repairs.
- C. There is a trend developing toward use of PVC for all repairs because of consistent OD's, ease of application.
- D. Repair costs vary widely, ranging from \$400 per incident to as much as \$5,000.

LEAK DETECTION PROGRAMS

CITY	UNACCOUNTED FOR WATER (%)	LEAK DETECTION PROGRAM	RESULTS	
			REDUCTION OF UFW BY 4%	B/C RATIO OF 7.7 ESTIMATED SAVINGS ARE \$1.17 MILLION/5 YEARS
HOUSTON	18	YES		
EBMUD	9	YES		
PHOENIX	8	PLANNING TO INITIATE		
SAN DIEGO	13.6 EST.	NO		
SAN ANTONIO	21	HAVE EQUIPMENT; PROGRAM INACTIVE		
EL PASO	7-12	NO		
SAN GABRIEL	4	DO NOT NEED		
PUEBLO	7	YES		
ABILENE	10	DO NOT NEED; LEAKS SURFACE		
HAYWARD	4-6	EXPECT TO INITIATE		
AVERAGE	10.5			

IX. Frequently Cited Problems and Needs

A. A/C

1. Lack of beam strength in 4-inch
2. Brittleness
3. Oversized B.O.D.'s
4. Information support on health issues
5. Research on bedding/breaks relationship

B. PVC

1. Fear of plastic resulting from plethora of polyethylene and polybutylene breaks
2. Fear of loss of ductility
3. No track record
4. Linking of production to petrochemical availability

C. Ductile Iron

1. High initial cost
2. Relative difficulty of installation

COMPETITIVE PRICE DATA

MATERIAL	AVERAGE WINNING BID (\$/FT)					
	4"	6"	8"	10"	12"	16"
A/C	2.11(4)	2.78(9)	3.94(7)	5.92(4)	7.82(5)	11.99(4)
PVC	2.25(2)	2.78(4)	4.67(4)	5.79(1)	9.58(3)	-
DUCTILE IRON	4.28(2)	5.01(4)	6.90(3)	9.34(1)	10.79(3)	17.24(1)

MAIN REPLACEMENT AND EXTENSION PROGRAMS

CITY	DOLLARS ALLOCATED PER YEAR (MILLIONS)	TIME PERIOD	AVERAGE MILES PER YEAR	PIPE MATERIALS USED
HOUSTON	25.2	11	-	A/C, PVC
EBMUD	9.38	5	43.6	A/C, STEEL, PVC
PHOENIX	2.0	CONT.	13.1	A/C
SAN DIEGO	3.0	20	16.2	A/C
SAN ANTONIO	7.8	4	22.4	A/C
EL PASO	0.6 - 1.2	CONT.	9.7	A/C
SAN GABRIEL	-	-	-	-
PUEBLO	1.45	CONT.	-	A/C
ABILENE	1.0	2	-	PVC, STEEL, A/C
HAYWARD	1.51	5	5	A/C

RATING AND CHARACTERIZATION OF WATER SYSTEMS

CITY	SOLID ACCOUNTS	STRONG PVC TRENDS	HEALTH ISSUE A FACTOR	FISCAL AUTONOMY	MARKETING, PR NEEDED
EBMUD		X	X	X	X
SAN ANTONIO	A/C PERFORMANCE A CONCERN			X	X
PUEBLO	X			X	
SAN GABRIEL	X			X	
EL PASO	X			X	
ABILENE		X		SOME	X
HOUSTON		X	X	NONE	X
HAYWARD	X		X	SOME	
SAN DIEGO	APATHETIC			NONE	X
PHOENIX	X		X	UNKNOWN	

X. Market Trends

- A. Five of ten systems are solid A/C accounts and will continue to be in the future.
- B. Three systems require attention and aggressive marketing to maintain their business.
- C. A significant trend toward PVC use is occurring at EBMUD (23.7% planned PVC use in 1982) and in Abilene (23.4% use in 1981).
- D. A/C solid accounts are strongly supportive and even defensive of the material.
- E. A/C is getting and can continue to capture the bulk of both growth markets and replacement markets west of the Mississippi.

XI. Conclusions

- A. Current success of A/C pipe can be attributed largely to competitive first cost.
- B. Slowdown in housing starts, growth, and the economy as a whole have been the major factors contributing to current market conditions.
- C. Developers and contractors are the major purchasers and installers of A/C.
- D. The Sun Belt cities are concerned about servicing growth, hydraulically undersized mains, replacing old CI mains; they are not so concerned about C-factor, life cycle costing, pumping costs, or leak detection.
- E. Users generally are pleased with A/C performance; bedding, beam strength, and irregular BOD's are the major problems.
- F. Users generally are not aware of industry problems.
- G. PVC has yet to make significant inroads into the A/C market.

XII. Recommendations

- A. The A/C industry should initiate an industry-wide aggressive marketing and public relations effort.
- B. Research is needed to solve the beam break problem; because a multitude of contractors install the pipe, proper bedding only mitigates the problem.
- C. Continued success is dependent on the commitment of the industry to the product; therefore, a strong commitment should be made and a long-term strategy developed to save the product.

AACPP PROGRAM UPDATE
by
John F. Welch
Vice President
A/C Pipe Producers Association

In 1980, the Annual Meeting theme was "New Directions '80". The primary thrust of AACPP programs was at the federal regulatory community and its adverse impact on A/C pipe markets. We were talking of product defense and product promotion. Even then, soft market conditions and regulatory impacts were taxing the industry's patience, its financial resources and its resolve.

In 1981, the Annual Meeting theme was "Horizons '81". We spoke of "images" and "linkages"...images of asbestos painted by the media as an extremely dangerous substance...and linkages between those images and the forces effecting perception of A/C pipe as a safe, desirable and necessary product for conveyance of potable water.

And here we are in 1982 with a theme of "Vista '82." Joe Jackson undoubtedly will have something to say about that theme so I will not preempt his remarks. 1982 is a year of "back to basics." It will be a matter of addressing the three R's. But instead of reading, 'riting and 'rithmetic, we are talking retrenchment, resell and regulatory response. These three R's are the basis for AACPP programs in 1982.

Retrenchment

In January of this year, in response to extremely weak economic conditions, the Executive Committee directed staff to revise Association programs. The rationale for this action was that the loss of market share to PVC pipe had become the driving force in a pronounced downward trend in A/C pipe shipments. Moreover, the closure of five A/C pipe plants east of the Mississippi River had been caused by and contributed to further regionalization of markets. Although the health factor continued to be "a small underlying, negative influence" affecting the use of A/C pipe, the prospect of increased regulatory or legislative activity at the state level counseled strongly for the maintenance of special counsel in core markets.

AACPP's revised program strategy, therefore, was rather straightforward:

- defend existing municipal markets for A/C pressure pipe against encroachment of competitive products
- defend existing municipal markets against regulatory and legislative actions, first in core markets and in other areas on a case-by-case basis.

Resell

The second "R" of our programs, resell, is the Municipal Market Program. This program is designed to reinforce the confidence of key municipal accounts in the cost/technical benefits and safety of A/C pressure pipe.

Staff will coordinate with corporate marketing and sales personnel in making twenty-four presentations to key utilities in core market areas. Presentation topics will focus on long-term cost and performance benefits of A/C pipe, industry acceptance, design and specifications, performance case histories, economic and technical justifications for continuing use of A/C pipe, the A/C pipe and health issue (if required) and other issues specific to the municipality.

While these topics may sound rather mundane, Staff expects the greatest value from the program to be (1) direct customer contact and (2) persuasively explaining reasons for plant closings in the context of current U.S. economic conditions. Staff currently is ranking the municipal accounts of greatest importance to the industry. It

comes as no surprise at all they are in the so-called "Sunbelt" areas. Staff plans to meet with District Managers to resolve priority conflicts and start developing account profiles. Special handouts and other materials have been ordered with the expectation of kicking off the first seminars in mid-year. Staff also plans to continue presentations to American Water Works Association sectional meetings in the core market areas.

Another facet of the Municipal Market Program will be to continue issuing positive information on product safety. Production of the "A/C Advisory" bulletins will continue. The advisories have been well-received by field sales personnel and are being direct mailed extensively to core market customers, as well as being handed out during routine sales calls. AACPP also continues to direct mail "Advisory" to state sanitary engineers, epidemiologists and health policy officials in all states in the United States and provinces in Canada. With your assistance, the content of "Advisory" will be expanded to include technical matters of interest to A/C pipe customers.

Advisories will be followed up by press releases to trade journals in the water works industry and similar publications in the environmental and occupational safety and health press. We have experienced good response to the releases as several have been republished or extracted in national and international trade journals. Often there is no attribution to AACPP, a situation which imparts greater credibility to the published piece since it does not smack of a vested interest.

Regulatory Response

The third "R" is regulatory response. The keystone of this effort is the State Monitoring Program. The State Monitoring Program acknowledges the growing importance of state and local governments in the implementation of environmental and occupational safety and health laws. This is a spin-off of the Reagan Administration philosophy of "New Federalism" that more or less mandates less involvement by federal government in state affairs. In some cases, the absence of preemptive federal regulations may facilitate the development of state regulations. Whether or not this will apply, to the asbestos industry in general or to A/C pipe in specific, remains to be seen. Further, this program recognizes that media coverage may result in local "hot spots," e.g. Connecticut, which may result in legislative or regulatory restrictions against A/C pipe.

It was clear that there was a need to keep in place a monitoring and response network to safeguard industry interests against adverse legislative and regulatory actions in core market areas. This response network was put into place in October, 1981 and is comprised of experienced special counsel skilled in monitoring legislation and regulation, as well as mounting counter-initiatives. The State Monitoring Program is working very well. It must be likened to an insurance policy with a high premium. It is costly to maintain, but the prospects of having no insurance and losing the core markets make it too serious to do without.

International Affairs Programs

As a result of yesterday's meeting of the International Advisory Committee, AACPP will be developing an annual statistical reporting program for total A/C pipe consumption in countries where the Association has members. AACPP continues to maintain consultancy relations with scientists in key task groups within the World Health Organization, which is studying asbestos in drinking water.

A growing area of staff involvement is liaison and intervention on behalf of

international members with funding organizations such as the World Bank, International Development Bank and International Finance Corporation. For example, Staff assisted Eternit in gaining World Bank approval for funding of a new pipe machine in Pakistan. In a technical area, we are assisting Sociedad Industrial Pizarreno in having A/C pipe specified for a \$6 million water project in Santiago.

To paraphrase comments made yesterday by Etienne van der Rest and Luis Cejudo, whether one talks about a country's economics or the problems of an industry, situations must be examined realistically. The programs just discussed may not be as glamorous as a national public relations campaign on the safety of A/C pipe...or doing an economic impact assessment on the ban of A/C pipe...or preparing the definitive technical treatise on the performance of A/C pipe versus ductile iron pipe. But these programs are realistic and responsive to the needs of today's market place. Coupled with what John Fischer (Johns-Manville Corporation) called "intelligent and enthusiastic business management", they can contribute to making the long-term viability of the A/C pipe industry a reality.

STATE OF THE INDUSTRY
by
Joseph C. Jackson
President
A/C Pipe Producers Association

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As should be evident from the cutback in attendance at this year's Annual Meeting and, more poignantly, the tenor of management's remarks, the state of the A/C pipe industry is in a single word—critical.

What at this time last year I depicted in an allegory as a slight case of the "grays" for Mr. A. C. Pipe has degenerated with real world rapidity into an obstinate state of economic depression for major sectors of the A/C pipe industry around the world. Moreover, the prospects of a near term turnaround in most industrialized sectors are slim at best.

Given the present set of circumstances, many, in and out of the industry, have concluded that A/C pipe has reached a "point of no return" in its product life cycle curve; and it will be all downhill from here on out regardless of any economic upturn. Certainly, continuing loss of market share, plant shutdowns and closures, and mounting red ink on corporate balance sheets do little to dispute this contention—a contention which not only undermines consumer confidence in the viability of the industry, but which competition exploits to exacerbate an already difficult marketing situation. Public and private expressions of doubt also have had a cancerous effect on the industry's ability and tenacity to solve, either individually or collectively, the myriad and nagging problems with which it is confronted. Nonetheless, even in a game of nerves, you can't win if you don't play.

It would be foolhardy, and ill serve the industry, to suggest there is an off-the-shelf panacea for the present dilemma. Nor would self-serving hindsight or humorous discourse change what corporate bottom lines show and say with clarity—the supply of A/C pipe exceeds the demand for A/C pipe. No amount of exhortation will diminish the complex and serious nature of the problems which this imbalance creates.

Add to surplus capacity, higher raw material and energy costs, a shrinking price advantage in the marketplace, limited business, and the pervasive spectre of asbestos regulation with its media fallout and consumer backlash, and you have the ingredients for a witch's brew rather than determinants in a profitable marketing equation. Throw in the growing realization that the pipe business is becoming a commodity market, where customer loyalty often equates to self-preservation and price to performance, and you immediately limit the degrees of freedom which the industry has to develop "quick fix" solutions to today's most pressing problem—declining sales.

In the long run, product innovation remains, as it has since the birth of the industry, the best answer to survival.

What about the short term? While persuasive rhetoric is not a remedy, it is a starting point. No, it's more than that; it can be the catalyst for decision-making. Numbers may be the common language and computers the translator; but it is individuals such as you, who will determine, in the final analysis, the fate of this industry. For sure, when push comes to shove, no one, but no one, outside of the industry itself probably gives a "tinker's damn" about A/C pipe.

Why should they? Our customers also run a business and will not leave to chance, any more than you or I would, the specification and purchase of the underground infrastructure upon which plans for urban growth and rural development depend. They need the assurance of a safe, reliable source of pipe at a competitive price. Conversely, industry needs the assurance of a significant share of the market and a reasonable return on investment.

So, where does one begin to marry these mutually dependent needs. A candid exchange of management insights as spotlighted at this conference obviously helps. However, I prescribe to the view that we are beyond the talking stage; we need results, not sermons. Thus, it is time I quit preaching to the choir and offer some concrete suggestions as to what can and cannot be done, must and must not be done.

Since I am not privy to your corporate books or constraints, nor do I have "hands-on" knowledge of your respective markets, the viewpoint which follows is biased by personal perception and will be presented in the context of the municipal water pipe market in the United States. Hopefully, my views—vista, if you will—are not so divergent as to be out-of-focus.

Let me begin with the obvious. To narrow the progressively widening imbalance between supply and demand, the U.S. industry has but two options: reduce capacity or increase sales. The former, plant closures, will remain a management prerogative; the latter, a function of three prime determinants:

1. U.S. economic climate
2. Public perceptions about the safety of A/C water pipe
3. Competitive encroachment into core market areas.

Since there is little the industry can do to stimulate the level of business activity or to stabilize the precursor to economic recovery, interest rates, this avenue for increasing sales can be dismissed out of hand. Moreover, given the current impasse over the budget cuts, it is unlikely the Reagan Administration will intervene to prop up housing starts—a traditional bellwether of pipe activity. Thus, short-term marketing strategy must be predicated on another premise. While I cannot dispute the ripple effect which an economic upturn would have on pipe sales, the survival of the A/C pipe industry must not bank on an expanding economy but maintaining at least existing market share. A decreasing share of an expanding market is a sure sign of trouble ahead; in a static market, it is the death knell of an industry. One need look no further than the A/C sewer pipe industry in the United States for substantiation.

Let's talk about loss of market share and the role which public perception about the safety of A/C pipe can or cannot play. Experience shows that public perceptions in the United States quickly become political realities. Political realities, in turn, can be the rationale for procurement decisions. And make no mistake about it, the industry must sell to municipal officials who are as much politician as they are engineer. Self-preservation often comes first, and price second, in their procurement priorities. This ranking of priorities is most evident in those municipalities where water revenues are pooled with other municipal revenues—an institutional interdependence which is generally found in older, major municipalities in the eastern part of the United States. Although there are exceptions, by and large, municipalities throughout the southwest and western states have autonomous water boards which by law are required to be self-sustaining operations independent of other municipal operations.

No doubt, this institutional difference relative to the management of water resources is not a matter of happenstance but reflects two salient geographical factors:

1. Water is critical to development in the west, incidental to growth in the east.
2. In the west, water revenues sustain water operations; in the east, water revenues subsidize municipal operations.

Simply put, western states are fiscally conservative, eastern states tilted towards deficit spending through increased taxation.

You might well ask, "what does this all mean in terms of the A/C pipe industry?" and particularly the question, "can or cannot public perceptions about the safety of A/C pipe contribute to the loss of market share?"

I believe that institutional factors, coupled to the prevalence of corrosive soils, were the impetus behind the industry's rapid acceptance and growth in the western, or so-called "core market" states.

Conversely, institutional factors in the east, as characterized by restrictive specifications, created an "iron" curtain around most major municipalities which even today is remarkably resistant to market penetration solely on the basis of price. As long as water revenues remain a budgetary pawn for politicians to sacrifice at will, there is little management incentive to consider cost-effective alternate materials. Perhaps increasing media attention on the decay of their urban infrastructure could bring about a public outcry for reform in the traditional approach to pipe procurement in the east.

Based on the pattern of field problems and litigation to date, I strongly suspect that these same institutional factors either act as a brake or an accelerator when the A/C pipe and health issue is raised and the media sees a story with political overtones.

At the risk of oversimplification, in the east, municipal water officials generally are poorly prepared to address the health issue, equivocating in their support of A/C pipe, and quick to pass the buck to the industry. It is not long before politics intervene, the situation is blown out of proportion by the media, and the industry embroiled in a public debate with drawn out litigious or legislative consequences.

In the west, water utility managers or their subordinates are reasonably knowledgeable on the health issue, outspoken in their support of A/C pipe, and quite capable of containing the problem at the local level.

Thus, the answer to whether public perceptions about the safety of A/C pipe can or cannot contribute to loss of market share is both yes and no. It depends on where the issue is raised.

This brings up the validity of the "domino" theory. That is, will adverse administrative rulings or legal decisions related to the health issue in the east trigger a chain reaction which will impact on core markets in the west? Quite frankly, I am ambivalent on this contention. While I accept the premise under present market conditions, the allocation of resources becomes a matter of priorities.

At this point in time, any further loss of market share in the west due to competitive encroachment can inflict far more damage on the A/C pipe industry than the loss of face in the east. Industry must sharpen the criteria upon which decisions to intervene in health-related field problems will be based. The industry cannot completely withdraw, but it can be highly selective as to where and when it will take a stand on the health issue. A much more cost-effective approach would be to step up efforts through AIA/NA to resolve the health issue at the federal level while maintaining in place and on call special legal counsel solely in core market areas.

While A/C pipe has had a dominant share of the water pipe business in these core markets, the encroachment of PVC pipe is accelerating. Some would contend that this

trend is in part self-inflicted. To an extent, they are right. Sales generally follow the path of least resistance, particularly, when a salesman has more than one product in his market bag. The question is, did the salesman create the opportunity through overt actions or was the opportunity already there?

For obvious reasons, I cannot, nor will I, stand in judgement of what others might perceive as predatory sales practices. This judgement must remain the prerogative of corporate management. Nonetheless, I would be remiss in my management obligations to the A/C pipe industry if I did not make the observation that key accounts will continue to hedge their commitment to A/C pipe to the extent that they perceive the industry is hedging its commitment. Regardless of motive, market impact is what counts.

Now, what about the opportunity that is already there for competitive encroachment? What market factors created this opportunity and what can or cannot be done by the industry to reduce our vulnerability? Undoubtedly, within some key municipal accounts, unique circumstances may arise and hidden factors surface which, for a limited time frame, may create the window of vulnerability through which competition may encroach upon what is presumed to be a "safe" account. The industry must be alert to this possibility by not taking any account for granted and making an overt effort to audit by direct contact key accounts on at least an annual basis.

The opportunity for competitive encroachment in any and all key accounts can be created by the interplay between one or more of the following factors. In order of priority they are:

1. Lack of industry attention
2. Price
3. Frequency of main breaks
4. Health issue

Let me work backwards, starting with the health issue. Because of the institutional makeup of most key accounts in core market areas which I discussed earlier, concern over the safety of A/C pipe is not a critical issue, simply an added nuisance. Nevertheless, the industry must not underestimate either the volatility of the health issue or its potential for making waves. The industry must be immediately responsive to any and all requests for help and must continue to provide relevant information on a regular basis to all key accounts both to ensure they have the in-house capability of putting out brush fires at the local level and to reduce the nuisance factor to an absolute minimum.

The frequency of main breaks is the common denominator by which water utilities measure the operational reliability of their distribution system and usually the pivotal cost factor in the equation for determining the need for pipe replacement. While energy costs and revenue lost due to unaccounted for water loss are important considerations, they are of secondary importance to key accounts in core market areas.

Since we can rule out external corrosion as a causative factor, A/C pipe main breaks are a euphemism for flexural failure—the industry's technical achilles' heel. As you well know, flexural failures generally result from improper installation and in most instances are corrected by the contractor before the utility gains title to the pipeline. However, of late, key accounts have become alarmed about an increase in the frequency of A/C water main breaks whose service life exceeds the startup period. The causative factor appears to be movement of the soil envelope surrounding the pipe induced either by expansive soils or seismic forces. Since the potential for catastrophic failure is

directly proportional to pipe diameter, this accounts for the reluctance of some key accounts to specify large diameter A/C pipe for critical applications and special bedding conditions for pipe 12" and less in diameter. Since the differential between installed costs for various pipe materials is less than the differential in pipe material costs, the opportunity for competitive encroachment is enhanced. The industry must pool its collective resources to develop a cost effective technical solution to A/C's flexural weakness. While this problem is not new, it is increasing in criticality and could well be the proverbial straw that broke the camel's back.

As far as price is concerned, although ranked Number 2 on my list, it is a market factor which again is solely a management prerogative and is better addressed by those with direct sales and profit responsibility. However, I would add head-to-head confrontations between competing products on the basis of price, at least in major municipalities, usually come out in favor of the product in which the municipality has both a large, vested interest and the industry's continuing attention. The success of the iron industry through the years in retaining key municipal accounts at premium prices is a perfect example of what a little bit of attention can do.

Lack of attention—a market factor which I ranked Numero Uno, Number 1—may be to the disbelief of some, the chagrin of other, but hopefully, to the concordance of all. I believe most key A/C pipe accounts really don't want to change but simply need continual, tangible assurance that the A/C pipe industry will be there...when they need us...where they need us...be it a sporadic concern over the health issue...a persistent main break problem...or whatever.

We have to tell them, loud and clear, we still care. We must stroke them...today...tomorrow...and for as long as we intend to retain their business. We cannot take for granted their product loyalty, but must reward it with a continuing industry interest and a corporate commitment...key people for key accounts. We cannot take a chance with our business. For as Sophocles observed, "Chance never helps those who do not help themselves." As I remarked earlier, even in a game of nerves, you can't win if you don't play.

Speaking on behalf of the Association, we are ready and willing to play. The price is right—survival of the A/C pipe industry.

Thank you.