

Bob Bruce PhD Innogyps Inc.

Survival Economics 2008

The depressed US housing market has led to lean times in the gypsum market, causing some inevitable plant closures and job losses. Nevertheless, Bob Bruce of Innogyps Inc. believes good times are ahead with the anticipated construction of high-efficiency plants and lower-cost wallboard production helping to stimulate future growth and competition.

The gypsum board industry in North America has enjoyed an extended period of growth, resulting in record shipments and profits in 2005-6. In the second half of 2006 however, the building industry entered a down cycle. The gypsum board companies are now once again scrambling for ways to increase sales and to reduce costs. With the slowdown in housing and the build-up of capacity now underway, shipments, pricing and profits are all declining. The purpose of this paper is to help explain the supply/demand situation, the impact that this will have on pricing, how the manufacturing cost base has changed with the move to FGD Gypsum and to new technology, and the opportunity for future cost reduction as these low prices become the new norm for the industry.

North American Gypsum Board Demand and Supply

Figure 1 illustrates the shipments for gypsum board in North America from 1970 to 2006, along with a view of the next four years based on a shipment reduction of

5% in 2007, 4% recovery in 2008, and then 5% in 2009 and 2010. With USA shipments tracking so far in 2007 at about 18% below last year, this forecast is rather optimistic but even with these figures the record volumes of 2005 are not repeated until 2009.

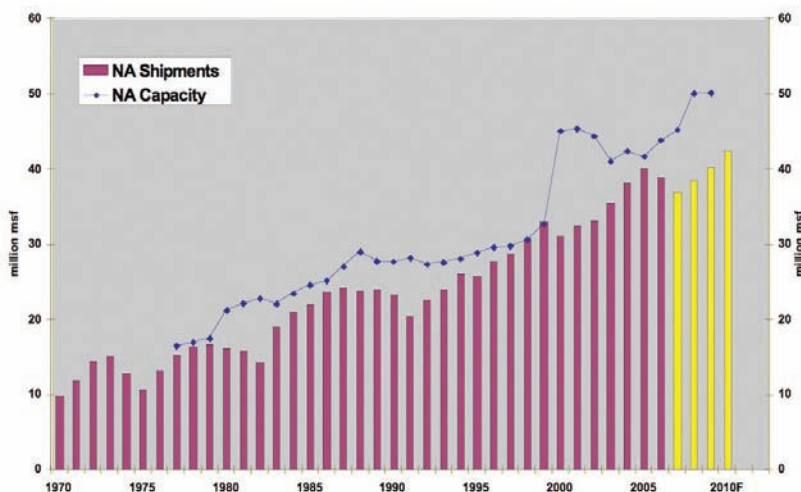
There have been some upgrades of capacity already, and many more underway as illustrated in Figure 2. Most of the new plants are the result of FGD Gypsum becoming available due to the Clear Air Interstate Rule (CAIR) but it is becoming increasingly apparent that the overall drive is to reduce the manufacturing cost base by whatever means, rather than just to take advantage of the recent availability of new FGD Gypsum sources. Figure 2 highlights the new capacity that has been announced or built already. While there are many locations that will be using FGD Gypsum (illustrated by green centres) there are many that are using gypsum rock (shown with black centres).

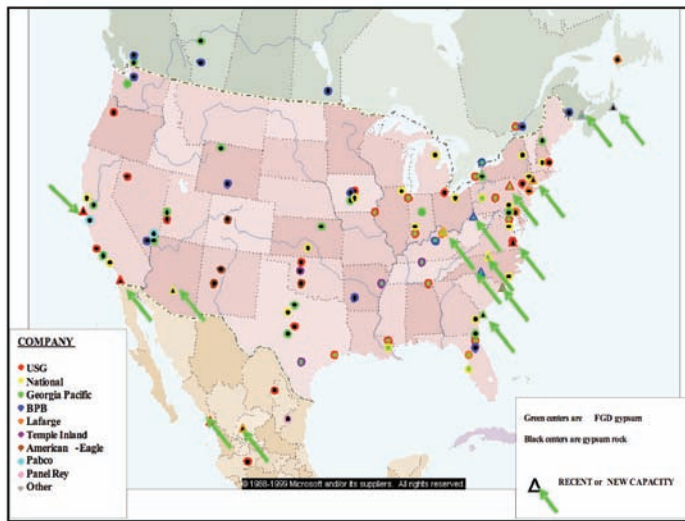
The extra capacity shown in Figure 2 is also shown in Figure 1 as a line on the bar chart to allow comparison against the forecast shipments. It is clear that the capacity utilisation will drop to below 80%. With

shipments for March 2007 in the USA at only 80% of last year, the capacity utilisation is already near 80%, meaning that the capacity utilisation is likely to drop well under 70% when the new plants are built.

Of course the solution is to close capacity, but the industry has historically let the price drop in each market to the marginal delivered cash cost for each region served before this happens. If there are several high cost plants needed to serve a market region then the price may not drop too far before plants need to close. Those regions with an oversupply at very low manufacturing cost, however, will experience some very low pricing until the supply is put back into balance by plant closures.

Below Right: Figure 1: Gypsum board shipments versus capacity





Left: Figure 2: Recent or announced new board capacity.

Review of this overcapacity situation begs the question “Why did the various players in the industry build so much extra capacity?” Although there was much discussion as announcements were being made about building capacity to meet customer demand this was only partly true. The underlying good reason to build capacity was the knowledge that eventually there would be another downturn (like now) and that to survive it would be necessary to reduce the cost base in order to survive the

Gypsum Board Pricing

It is interesting to review the pricing experienced by the industry during 1999-2001, the last time that capacity seriously exceeded demand. USG reports their average pricing on a quarterly basis through their Securities Exchange Commission (SEC) reports, which represents a good indicator of pricing across the US. This data is shown in Figure 3. Their SEC 10Q report for the second quarter 2001 describes the pricing below US\$72.42 per million square feet (Mft²) for the quarter and under \$70 for one month in that quarter. Since then the price has risen to above US\$185 per Mft² and then last fall begun to drop once again. Although there have been price increases for energy, starch, paper etc. over the past few years, there has been major improvement in the overall cost base of the industry as well and the marginal cash cost has not really changed that much. If the utilisation rate falls below 70% then pricing will behave very similarly to 2001. Analysis of the strategic positions of the various producers, along with the normal behaviours of the various players in the market channels, suggests that this rather inefficient process is really the only route to the required plant closures and price recovery. It is inevitable that prices will recover, but only after the capacity utilisation approaches 90%. This process could take considerable time given the current market circumstances. A typical manufacturing operation is normally satisfied if it can enjoy a long term return on sales (ROS) of 10%. This level will generate an acceptable rate of return on capital employed for an industry with good inventory turnover and reasonable capital costs to set up operations. Even at the current pricing of less than US\$150 per Mft² this target is easily met.

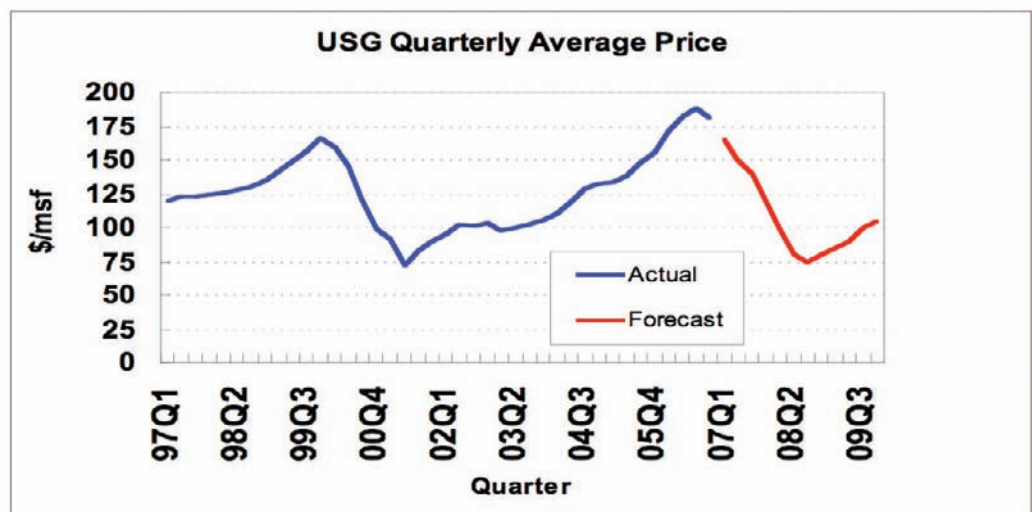
inevitable low pricing. If everyone else in the region has a low cost plant then you had better have one too or you will be forced out!

Manufacturing Cost Improvements

In the east it was the availability of new sources of low cost FGD gypsum that triggered the building of new plants, and in some cases the expansion of others that are already powerhouse plants in the industry. In some regions, however, plants based on rock have been built, perhaps not having unusually low cost gypsum but still enjoying lower energy, labour and additive costs and improved efficiencies. Mexico is building capacity to feed the growing local market, but until the market catches up with the capacity being built there will be board available to ship north into the USA. In the west a high proportion of the capacity is rather aged and high cost, making these plants ideal candidates for replacement with new facilities.

Figure 4 illustrates the cost savings that can be realized if an older plant that brings rock in from afar (perhaps

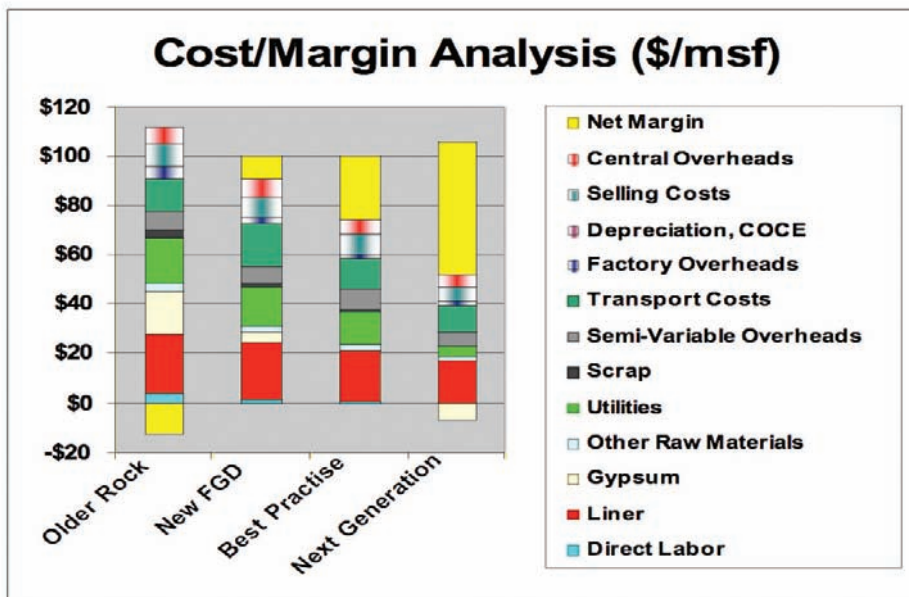
Below: Figure 3: USG quarterly gypsum board pricing



Nova Scotia to Florida) is replaced with a modern plant that has low cost FGD Gypsum nearby. The two bars on the left represent the main cost components to make ½ inch standard board for these two plants, with the interest/depreciation rate set to zero to focus on only cash costs (including freight) and overhead costs. The solid colours are the cash costs and the bar sections with the white edges are considered overhead costs. A selling price of US\$100 per Mft² has been used to illustrate the margin available for each plant at this price level. By using this price it is also easy to see what is needed to achieve the 10% return on sales because each dollar saved is equal to 1% of return on sales.

trates how far this will take a plant in this competition to be lowest cost. Notice that a plant selling all ½ “standard” board for US\$100 per Mft² would be making over 25% ROS, or over US\$25M (profit before tax on plant size of 1.2bnft²). When the gypsum board industry was short of capacity and prices were high there was little incentive to reduce costs, especially if there was any risk of lost production. As a result the “Best Practice” of today has not really benefited from the urgency to reduce cost that will be experienced over the next few years of intense competition. There is still much to be done to reduce the cost of making gypsum board. As the FGD Gypsum market develops and disposal costs

climb, FGD Gypsum prices will drop for those that are willing to play this game. Both board weights and liner weights will drop as companies learn how to better construct the core of the board. Energy costs are far too high for gypsum board and the industry will learn how to use low cost methods to reduce the amount of water needed to be dried from the board. In addition the industry will learn to use fuels less expensive than natural gas. Labour costs are already low at the “Best Practice” level but can drop a bit further, but the saving in personnel costs will come from reduced central overhead and selling costs, especially if the move into distribution continues. A



Above: Figure 4: Cost/margin analysis for gypsum board production

As can be seen from Figure 4, at this price level the older rock plant is able to cover cash costs and delivery but would be losing money overall. The biggest savings for the larger modern plant are in gypsum costs, labour and energy with savings as high as US\$13, US\$3 and US\$3 per Mft² respectively. Additive costs, yield improvements, and reduced overhead costs should save another US\$5 per Mft² but with added freight costs for a larger shipping area the net saving would be in the order of US\$21 per Mft². Obviously this would go a long way towards achieving the 10% ROS target and go from a plant losing money at this low price to one that is really not too badly off.

As competition heats up there will be a push to reduce costs even further. It is useful to consider what a plant could likely do if it was to implement the best available proven technology. A good example of this would be the two stage dryer described at last year’s conference (Global Gypsum 2006) as being the best available (at 589kcal/kg water). The same larger plant with minimal production crew, low downtime and scrap, low basis weight paper, FGD gypsum at no cost, best energy consumption for calcining and drying would be able to shave a further \$10 per Mft² from the costs, albeit with some capital required to make everything just right. The third bar chart in Figure 4 labelled “Best Practice” illus-

further US\$27 per Mft² could be saved if these more ambitious targets are achieved. At this cost level, the 10% ROS target would be achieved at a selling price of less than US\$60 per Mft².

Summary

The gypsum board industry in North America is entering a trough in market demand at the same time that considerable new capacity is being built to reduce the cost base of the industry. Prices will fall to the level where many plants will be forced to close, simply because they will not be able to compete on a delivered cash basis compared to the new lower cost capacity that is being built.

The cost savings for the new plants can be significant, not only because of the availability of low cost FGD gypsum but also because the modern plants are faster, more reliable and more energy efficient. With the more competitive market, efforts will redouble to reduce manufacturing costs and to incorporate all proven cost saving measures. In addition opportunities exist to take the industry to a whole new level of low cost production, something that will receive new impetus from the upcoming intensely competitive market.

