

Western European Recycled Containerboard
Risk Study
Risk of Closure Study

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Methodology of the Study

by Orifjon Abidov

This chapter examines how mill scores and risk rankings are derived and presents the results of these rankings. In this study, we assessed the risks for closure of Western European mills only. There are 85 recycled containerboard producing mills included in this study. All of these mills have an annual capacity of at least 25,000 thousand metric tons per year and produce recycled-based liner and/or medium.

Mills are ranked in three broad risk classes: *Low Risk*, *Moderate Risk* and *High Risk*. The boundaries for the low and high risk classes are chosen to capture those mills that are in a significantly better or worse position than the majority of the recycled containerboard mills. The *Low Risk* mills are nearly invulnerable to closure, even in a protracted downturn. The *High Risk* mills are deemed vulnerable to either partial or full closure in weak markets.

Several factors contribute to the viability of these mills. The eight major criteria used to assess the risk of mill closure in this study are: cost position, market prospects, future recovered paper supply, corporate significance of the mill, average recycled containerboard machine size, average recycled containerboard machine age, potential for a mill to switch production to other grades and the access that a mill has to export markets. Each factor is given a different weight proportionate to the significance of its effect on mill viability.

This risk assessment of recycled containerboard producing mills attempts to capture the market outlook and sustainability of the recycled containerboard portion of board producing mills. For the purposes of this report, the risks associated with each mill pertain only to the closure of one or more of their recycled containerboard machines and does not necessarily reflect the viability of the mill overall. In this report, the term "mills" is used rather than "mills and/or the part of the mills that produce recycled containerboard" for the sake of simplicity and flow. Please be aware of this distinction in the interpretation of the following text and materials. In some cases, the entire mill is at risk. In other cases, only one recycled containerboard machine at a mill may be at risk for closure. Distinctions are clarified in the chapter entitled "Analysis of High Risk Mills," where each mill is individually assessed.

In addition, mills that fall into the *High Risk* classification include approximately the bottom 8.7% of total industry capacity. Obviously, not every mill classified as *High Risk* will close, but this category does include those mills most likely to shut down. It is important to stress that for every mill closure, the overall risk of closure of all other recycled containerboard mills is diminished due to the decreased competition.

Methodology

Developing a Mill Ranking System

To rank each mill's overall risk of closure requires developing a system of weighted averages to combine the eight criteria mentioned above. The weight of each criterion is determined by the relative importance and quality of data. The eight criteria and their corresponding weights are listed below:

- Cost Position, 30%
- Market Prospects, 20%
- Future Regional Recovered Paper Supply, 20%

- Corporate Significance of the Mill, 15%
- Average Recycled Containerboard Machine Size, 5%
- Average Recycled Containerboard Machine Age, 5%
- Potential to Switch Production to Other Grades, 2%
- Access to Export Markets, 3%

Generally, risk scores range from 1 to 5 with 1 representing the lowest risk score and 5 representing the highest risk score.

Cost Position

Since the single most important risk factor determining a mill's chance of survival is its cost position relative to competing mills, this criterion is given the most weight at 30%. If a mill's cost of production is significantly above the norm, its ability to function profitably in weak markets will be seriously impaired, which in turn forces a company to consider permanent closure of a mill or one of the higher-cost machines at a mill. Cost data provided by RISI's Cost Benchmarking Service are used to determine the competitive position of recycled containerboard mills when compared with one another.

The cost estimates represent cash costs for a particular grade produced at a given mill in the second quarter of 2009. RISI's Cost Benchmarking Service derives its cost data by reconciling machine output with the required inputs (including recovered paper, labor, energy, chemical, material and furnish costs) and calculates the total cash cost of production (in euros) using reported costs for each of the above inputs.

Based on each mill's cost position, mills are scored from 1 to 5, with 5 representing the highest costs mills and, consequently, the mills with highest risk of closure based on costs alone. A score of 3 corresponds to mills with average costs, and 1 denotes mills with the lowest total cash costs and risk of closure. Since average production costs vary according to the various grades, we have graphed the costs associated with each grade separately.

All final cost rankings are then determined for each mill according to its grade breakdown. For example, let's examine a mill where 60% of its recycled containerboard products fall into the heavyweight recycled unbleached linerboard category and the remaining 40% are classified as lightweight white top linerboard. On the cost position graphs, the costs associated with producing the heavyweight unbleached grade for this mill fall into the fourth score range, while the costs for producing the lightweight grade are relatively low and fall into the second range. This mill's final cost ranking would then be equal to 3.2, derived from the equation $(60\% \times 4) + (40\% \times 2)$.

A final note is that costs can vary considerably with respect to certain highly volatile drivers such as energy costs and exchange rates. For example, as the British pound weakens relative to the euro, British recycled containerboard producing mills disproportionately decrease their risk of closure.

The cost estimates used for this study are for the second quarter of 2009, and the risk rankings might change somewhat as the cost drivers change over time. Therefore, in this study we provide a snapshot of cost rankings based on cost input data from the second quarter of 2009.

Market Prospects

The current and future market environment for a particular recycled containerboard grade will play a major role in determining a company's strategy concerning a particular facility, so this factor receives the second highest

weight of 20%. Some markets will experience fundamental changes limiting growth in demand and future profitability. The Market Prospects score reflects RISI's evaluation of a mill's ability to compete given the risks and probable changes in market fundamentals such as patterns of use, growth in market demand, competitive pressures from other grades and direction of prices.

The mills' final market prospects scores are, like cost position scores, based on each mill's grade breakdown. If 70% of a mill's recycled containerboard capacity consists of a grade with a market prospect score of 2 and the remaining 30% consists of one with a score of 4, the mill's overall market prospect score will be 2.6 or $(70\% \times 2) + (30\% \times 4)$.

Future Regional Recovered Paper Supply

The outlook for recovered paper supply in the region surrounding a paperboard mill is an important factor in deciding whether to commit resources to upgrade a faltering mill or to close the facility. This criterion is assigned a weight of 20%. Our evaluation of the prospective supply of recovered paper for individual mills is based on information we have pertaining to the national collection rates¹ for recovered paper and the historical trends for net trade of recovered paper in each Western European country included in this study. Each country is assigned a different score for recovered paper availability. For example, Germany, which exhibits a high collection rate and has historically been a net exporter of recovered paper, was assigned a score of 1. On the other hand, Spain, which demonstrates slow growth in recovery rates and is a net importer of recovered paper, scores a 4.

The risk score for recovered paper supply is a subjective measure of changes to the future availability and cost of raw material in the vicinity of the mills.

Corporate Significance of the Mill

Decisions about closing a mill have in the past been heavily influenced by the position held by the mill in the company's portfolio of assets, and so this factor retains a 15% weight. Mills that make up a higher proportion of the total recycled containerboard capacity of a company (and are thus key assets) are less likely than their counterparts to be closed during times of financial strain. This difference in likelihood is because mills that have more capacity make a higher percentage of the revenue for their parent companies.

For example, a company that has only one mill makes 100% of its revenue from that mill and would only close the mill under the direst of circumstances. However, if that same mill were part of a large multi-mill company, its risk of closure would be far greater because the parent company could potentially shift production to other mills. Thus, a mill with capacity equal to a 100% of the company's total will get a score of 1, while a mill with only 2% of total company capacity will get a score of 5.

The ratio of the recycled containerboard capacity of a mill to the total recycled containerboard capacity of the company is calculated and then compared with all of the other mills in this study. The higher this ratio, the less likely the company will be to close the mill and the lower the corresponding risk score will be. Likewise, the lower this ratio, the greater the probability the company will opt to close down these recycled containerboard machines and the higher the associated score will be.

¹ National Recovered Paper Collection Rates were kindly provided by CEPI (Confederation of European Paper Industries).

Machine Size Ranking

The average size of a mill's recycled containerboard machines is an indicator of the scale of investment in the facility and the company's commitment to that facility. This ranking is given a weight of 5%. Larger machines also tend to be associated with newer facilities and can have a positive effect on a mill's profitability.

The methodology used to arrive at a size ranking score is similar to other categories. The average size of the recycled containerboard machines at one mill is compared with the averages of all other mills and ranked according to their relative position. It should be noted, however, that we have used weighted averages for the scores of multi-machine mills. For example, let us look at a mill that has two machines: PM1 with 40,000 tonnes annual capacity (which will get a score of 5) and PM2 with 160,000 tonnes annual capacity (which will get a score of 3). The total score for the mill will then be 3.4 or $(20\% \times 5) + (80\% \times 3)$.

Age Rank

The age of a mill's board machines can signal the need for capital investment or possible environmental problems associated with older production systems. We estimate the average age of a mill's machine based on the year the machine was built and the year of the last rebuild. If the machine has been rebuilt, its effective age is equal to 70% of its age and 30% of the years between today and its last rebuild. Otherwise, the machine's effective age is exactly equivalent to its age. Machines are then assigned a risk score from 1 to 5 based on a comparison with all other machines. To obtain the final score for the age of each mill, we have taken the weighted average of the scores of each machine.

To better understand the calculations behind the age ranking, we will examine a sample mill with two machines. The first machine was built in 1970 and rebuilt in 1988 and 1998, so it has been 38 years since its initial build and 10 years since the last major rebuild. Therefore, the effective age of this machine is almost 30 years, from this equation $(70\% \times 38) + (30\% \times 10)$. After a comparison with other regional machines in the study, this machine may be assigned a risk score of 3.

The second machine was built in 1995, but has never been rebuilt. Its effective age is the same as its regular age, 13 years. The effective age of the second machine may merit a risk score of 1 for its relative youth.

The mill's Machine Age Ranking is based not on the rankings of its machines, but on the average effective age of its machines. In this case, the average effective age of the mill's machines is about 21 years. An average age of 21 years for its machines might earn this hypothetical mill an Machine Age Ranking of 2. Although this is also the average of the two machine age rankings, this may not always be the case.

Getting a precise measure of the effective age of equipment at board mills is quite difficult. Major gaps exist in the published record on the age of machinery, and incremental improvements to mill equipment are not always reported. If no concrete data are available for a particular machine, the machine's age was estimated based on RISI's previous knowledge of its approximate age. The age ranking is given a weight of 5% in the final computation of the mill's overall risk score.

Potential to Switch Production to Other Grades

Some mills have a certain product flexibility that they could leverage in tight markets. This is the reason why we have included a criterion that represents the mill's ability to switch its output to more profitable grades. We have weighted this ranking at 2%. Those mills that show such flexibility were given a score of 1, while those with a relatively limited product mix were assigned a score of 5. We determined the ability of a mill to switch to alternative products based on the following factors: the mill's ability to produce lightweight grades, the mill's ability to produce higher quality grades such as white top liners or if the mill produces other paperboard grades

such as virgin-based containerboard, plasterboard liners, specialty and industrial papers and cartonboard. This score is a subjective measurement of the near future ability of a mill to adapt to changing market conditions.

Access to Export Markets

A significant number of Western European recycled containerboard producers serve a large customer base. Some mills dedicate their output strictly to their national markets, while others seek diversification and choose to export as well. Over the last few years, transportation costs have risen, giving an advantage to those producers who are closer to their customers. In that sense, these producers are better able to handle local price shocks and market pressures. Therefore, we have given a 3% weight to the ranking of the geographic location of each mill and its access to export markets. This is a subjective measurement only, and depends largely on the mill's proximity to land or sea borders. The closer the mill is to a major port or a junction of land borders, the lower risk score it will get. On the contrary, a more remote inland location is likely to get a score of 5, reflecting higher costs of reaching international customers and thus higher risk.