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Macmet Engineering Limited: An In-Depth Cost Analysis

Pooja Krishen wrote this case under the supervision of Ian Dunn solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

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It was mid-December in 2017, and P. K. Madappa, managing director of Macmet Engineering Limited (Macmet), located in Kolkata, India, was preparing for an upcoming negotiation with client Coastal Projects Limited (CPL). CPL had submitted a project proposal for the supply and installation of a water filtration system, and Madappa wanted to conduct an in-depth cost analysis to determine a competitive bid for Macmet to win the project.

In the past, bids were made based on a full-cost basis; however, Madappa wanted to take current industry and competitive trends into consideration to see if a bid based on a direct-cost basis would be necessary to secure this particular project. He had to work quickly, as competitors would be bidding on the project as well. It was important that Macmet take on projects that were ultimately profitable for the company.

the material-handling equipment manufacturing industry

In India, the material-handling equipment (MHE) manufacturing industry was growing rapidly. The MHE market primarily consisted of forklift and crane manufacturers, who accounted for 63 per cent of the industry market share, with all other MHE manufacturers comprising the remaining 37 per cent.[[1]](#footnote-1) A number of these other manufacturers, including Macmet, designed and constructed transportation systems, such as conveyors, to move bulk materials including metals, cement, steel, and power across various distances. The MHE industry was projected to grow at a compound annual growth rate of 10 per cent between 2016 and 2022.[[2]](#footnote-2) The government of India was further incentivizing the manufacturing industry by abating foreign direct investment regulations as well as lowering the tax rate for manufacturers whose profit exceeded US$38.8 million.[[3]](#footnote-3)

The easing of foreign investment regulations had lowered the barriers to entry into the MHE industry. As a result, international companies from Europe and other parts of Asia had entered the market. Prior to this, the industry had already been highly fragmented, with upwards of 300 moderately sized competitors vying for projects. There were numerous small companies operating as well. These smaller players tended to specialize in one or two specific material systems. The vast number of companies in the industry made a bidding process necessary to win client orders. Due to international companies’ brand recognition and higher operating costs, starting bids tended to be higher than regional companies (not international); therefore, these international companies’ offerings were typically accessible to larger clients.

Global demand for steel had dropped over the past five years, evidenced through iron ore commodity prices falling by 12.4 per cent from 2012 to 2017.[[4]](#footnote-4) Despite this, in 2017, India was the third-largest producer of steel in the world due to its abundance of iron ore. In the same year, the country’s steel production increased by almost six per cent to over 100 million tons.[[5]](#footnote-5) Between 2013 and 2017, government infrastructure spending in the construction sector in India increased from 7.4 per cent to 9.0 per cent of India’s gross domestic product.[[6]](#footnote-6)

A multitude of material transport systems were available to suit customers’ diverse needs. These systems included overland-troughed and pipe conveyors, which transported materials across long distances, and shuttle conveyors and travelling hoppers, which were typically seen within manufacturing facilities to transport material shorter distances. It was also possible to move material from ground level to a higher elevation using a system called a surface feeder. The ability to offer many of these options and tailor them to meet specific customer needs was critical to winning bids.

Macmet engineering limited

Macmet was founded in 1974 in Kolkata, India. Over the past two decades, it had established itself as a leader in supplying and installing material-handling systems and water screening equipment. Macmet had successfully installed over 1,000 conveyors and more than 100 water filtration systems across India. Additionally, it was responsible for supplying a 21-kilometre conveyor to HeidelbergCement India Limited that was capable of transporting limestone at 1,000 tons per hour (see Exhibit 1).[[7]](#footnote-7) In 2017, Macmet was executing the world’s longest pipe conveyor system for one of India’s leading steel companies. Macmet had developed a strong reputation and was continuously looking for opportunities to install systems globally. There were discussions about Mitsubishi Hitachi Power Systems Ltd. considering Macmet to supply a system in Kenya in early 2018.

With a bachelor of commerce from St. Xavier’s College, Kolkata, managerial experience at Citibank, a chartered accountant designation, and an MBA in finance and entrepreneurship from the Simon Business School at the University of Rochester, Madappa succeeded his father as managing director of Macmet in 1990 and led Macmet through its transition from an information technologies service company into the material-handling leader it had become. Macmet operated in Kolkata out of a 22,145-square-metre production facility and office and had approximately 200 employees.

The majority of Macmet’s customers came from the power, steel, cement, and mining industries. Projects were custom, as a variety of factors needed to be considered in order to put a successful material-handling system in place. Some of these factors included the type of material being transported as well as the transportation distance, the transportation direction, and the location to which the material was being brought. Maintaining strong client relationships was critical, as Macmet continued to service systems for clients after the initial supply and installation process was complete. As transporting bulk materials could quickly become costly, customers valued system designs that lowered operating costs. Macmet bore this in mind throughout the design process. Quality, timeliness, and price were important considerations for clients. Macmet’s sales for the first 11 months of Fiscal Year 2017 totalled $12,982,350.

Sales Process

The sales process began when a client submitted a project proposal, including the necessary system specifications, to a sales representative. Next, the project team underwent a cost analysis to determine the cost of designing, planning, and constructing the system. These costs included direct materials and labour costs as well as allocations for overhead. Once the cost analysis was complete, a bid was submitted to the client among multiple bids from other competitors. If the client decided to proceed with Macmet, work on the project would commence.

THE PROJECT

CPL, a large power supply company located in Anantapur, India, had submitted a proposal to Macmet for the supply and installation of a water filtration system. CPL was a first-time customer for Macmet. Given the nature of the systems provided, repeat supply and installation business was not very common; however, Macmet provided customers with ongoing maintenance of installed systems. A variety of expenses were budgeted for the project based on similar past projects. The CPL project was expected to make up at least 10.5 per cent of the total sales for fiscal 2017.

The raw materials required to build the water filtration system, including cement and steel, amounted to $627,563. Many of these materials had to be manufactured in-house into parts prior to being transported to the project site. Due to the sheer size of projects and the large quantity of materials necessary to bring projects to fruition, raw materials typically comprised the majority of project costs. The factory vehicles used throughout the manufacturing process were maintained annually, with the maintenance fee split across all of Macmet’s projects according to percentage of sales. Factory vehicle maintenance expenses for the year totalled $34,829.

Rent was allocated based on the square footage of the factory that was occupied for each project. Macmet’s annual rent totalled $185,000. The CPL project encompassed 3,300 square metres of space, 37 per cent of which was used for production-related activities. Rent associated with the office space was expensed through overhead office infrastructure expenditures. Additionally, projects required the use of specialized machinery. This machinery incurred repair and maintenance costs of $92,257 in fiscal 2017, which Macmet split among all projects based on sales. Power charges of $10,285 were also incurred for running the production machinery for the CPL project, specifically.

Inward and outward transportation expenses cost $14,560 and $18,790, respectively. Inward transportation expenses pertained to moving the construction materials required to build the water filtration system to the project site, while outward transportation expenses accounted for hauling excess materials and debris off-site throughout the construction process. These expenses included wages for the vehicle drivers. Fuel costs for the transport vehicles were $6,965, in addition to the inward and outward transportation expenses.

Once the parts had been manufactured and transported to the project site, installation took place. These expenses amounted to $22,500 for the CPL project. Installation expenses varied substantially between projects, given the custom nature of each system as well as the location, which often dictated how difficult the system would be to install. As such, installation expenses were only incurred on a per-project basis.

Macmet incurred significant insurance expenses to cover the wide array of business risks inherent in its operations. It had two insurance policies—one to cover manufacturing and project-related risks, and a second to cover its sales and administrative operations. Administrative-related insurance was expensed through office infrastructure expenses. Insurance was billed to the company annually, and management allocated a portion of the production-related expense to each project on the basis of size, risk, and length of time to completion. The portion of the expense allocated to the CPL project was $9,480.

Wages for the workers assigned to the CPL project totalled $100,264. These workers included factory personnel responsible for manufacturing the project parts, as well as the site crew, who were in charge of preparation and assembly. In addition to waged workers, Macmet employed factory staff. Factory staff consisted exclusively of managers overseeing production and manufacturing processes. For the CPL project, specifically, they were paid a total of $46,241 and were also provided benefits in the amount of $4,589.

Annual sales and promotion expenses of $15,351 were incurred by Macmet, $560 of which was related to the CPL project. These direct selling expenses consisted of the costs associated with obtaining projects and were directly attributable to specific jobs. Additionally, $6,234 was allocated to travel expenses for the sales associates working on the CPL project.

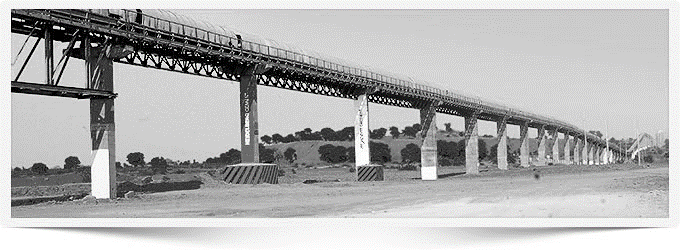
Several other miscellaneous expenses were incurred annually and split evenly among all of Macmet’s active projects (see Exhibit 2). These expenses consisted solely of general and administrative charges, selling expenses, and financing charges and were allocated to projects as a percentage of sales. Additionally, Macmet had allocated $112,545 of management expenses to the CPL project.

Sales overhead and office infrastructure expenses were quoted annually (see Exhibit 3). To allocate sales overhead, management used sales hours. For the CPL project, 1,600 hours were budgeted. Total sales hours for 2017 was estimated at 28,000 hours. Finally, office infrastructure expenses were allocated on the basis of area occupied. Office infrastructure expenses consisted of office-related rent, utilities, general insurance, administrative salaries, and maintenance costs pertaining to the facility and office equipment. Madappa hoped to meet a net profit margin target of between 10 to 20 per cent.

Required

Madappa sat down to determine the direct cost, absorption cost, and full cost of the CPL project. Based on industry trends and competitive pressures, he wondered how competitive of a bid he needed to negotiate in order to get CPL to choose Macmet.

EXHIBIT 1: overland-troughed BELT CONVEYOR

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Source: “Introduction,” Macmet Engineering Limited, accessed June 6, 2018, www.Macmet.co.in/Macmet-conveyors/Macmet\_conveyors.html.

**EXHIBIT 2: MISCELLANEOUS COMPANY COSTS (US$)**

|  |  |
| --- | --- |
| **Miscellaneous expenses** |  |
| Office maintenance | 34,286 |
| Car hire charges | 18,000 |
| Postage charges | 4,343 |
| Telephone charges | 4,448 |
| Printing and stationery | 3,048 |
| Advertisement expenses | 12,190 |
| Legal expenses | 80,952 |
| Finance charges | 78,095 |
| **Total** | 235,362 |

Source: Company files.

**EXHIBIT 3: ANNUAL OVERHEAD EXPENSES**

|  |  |
| --- | --- |
| **Overhead item** | **Annual expense** |
| Sales overhead | $465,950 |
| Office infrastructure expenses | $270,182 |

Source: Company files.

1. “Demand Runs High in India’s Materials Handling Industry Wisconsin Economic Development Corporation,” Wisconsin Economic Development Corporation, December 2017, accessed June 18, 2018, https://wedc.org/export/market-intelligence/posts/demand-runs-high-indias-materials-handling-industry. [↑](#footnote-ref-1)
2. Ibid. [↑](#footnote-ref-2)
3. Ibid; “Manufacturing Sector in India,” India Brand Equity Foundation, April 2018, accessed June 18, 2018, www.ibef.org/industry/manufacturing-sector-india.aspx; all dollar amounts are in US dollars unless otherwise specified. [↑](#footnote-ref-3)
4. Iron ore was the core component used in steel manufacturing; “Global Iron Ore Mining Industry – Market Research Report,” IBISWorld, November 2017, accessed June 18, 2018, www.ibisworld.com/industry-trends/global-industry-reports/mining/iron-ore-mining.html. [↑](#footnote-ref-4)
5. “Iron & Steel Industry in India,” India Brand Equity Foundation, April 2018, accessed June 18, 2018, www.ibef.org/industry/steel.aspx. [↑](#footnote-ref-5)
6. “Share of Construction Sector Infrastructure Spending as a Part of India’s Gross Domestic Product (GDP) from FY 2008 to FY 2017,” Statista, accessed June 18, 2018, www.statista.com/statistics/726485/india-share-of-construction-infrastructure-spending-in-gdp. [↑](#footnote-ref-6)
7. This cross-country troughed conveyor system was the largest conveyor system operating in India. [↑](#footnote-ref-7)