

Mattel, Inc: Vendor Operations in Asia

Only 3% of the world's children are here in the U.S. Our biggest opportunities are in growth outside the U.S. (Jill Barad, President & CEO, Mattel, Inc.)

The sun was just breaking over Kowloon Harbor. From his corner office, Ron Montalto gazed across the water and watched the early morning light reflect off Hong Kong's famous downtown skyline. Only 24 hours ago Ron had been riding around the Carolina Speedway in Kyle Petty's blue Pontiac, emblazoned with the Hot Wheels logo. The event was part of the kickoff for a new series of Hot Wheels® replicas of NASCAR racers. Now, back in Hong Kong questions still swirled around the sourcing decisions to build those and the rest of the die-cast family of miniature cars. Starting over a year ago with the announcement of the merger between Mattel, Inc. and its second largest rival, Tyco Toys, Montalto had been embroiled in a debate over the sourcing strategy for the existing Hot Wheels product line and newly added Matchbox® cars. By July 1997, the company had decided to build a wholly owned manufacturing facility in the Guangzhou region of southern China, starting production in 1999. The Asian currency crisis that ensued later that fall had reopened the "build decision." It was now the beginning of March 1998 and all of the original options were once again under debate.

While in the U.S., Ron had met with his boss Joe Gandolfo, President of Worldwide Manufacturing Operations and learned that he would be reassigned within the next month to oversee die-cast car operations. An ex-lawyer who had lived and worked in Hong Kong for nearly fifteen years, Montalto was a Senior Vice President and had been responsible for company's Vendor Operations Asia division (VOA) which managed Mattel's outsourced production. Mattel began the vendor operation program in 1988 hoping to add flexibility to the company's traditional in-house manufacturing. Montalto had spent the last ten years developing VOA into one of Mattel's most valuable strategic assets. In 1997 it was responsible for manufacturing products that generated nearly 25% of the toy company's total revenue.

The Tyco merger resulted in VOA manufacturing products that generated an additional \$350 million in revenues for the Mattel organization. The majority of those revenues came from a combination of Tyco's Matchbox die-cast cars, its line of radio-controlled (RC) cars, its View Master® series and products from its Sesame Street license. With demand for Matchbox cars at 64 million units in 1997 and growing, die-cast capacity concerned Montalto the most. Tyco manufactured the cars through joint-venture arrangements in Shanghai and

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Bangkok. Both of the joint ventures were minority share partnerships which raised questions for Mattel in the future. What's more, the quality of Matchbox products had been eroding for years and was currently at an all-time low. The production equipment and steel molds used in the manufacturing plants were becoming obsolete. Though it might be possible to upgrade the existing Tyco operation in Bangkok, Mattel saw little hope of expanding the Shanghai operation.

Mattel owned a state-of-the-art die-cast facility that was operating at full capacity in Penang, Malaysia (see Exhibit 1). Expanding that facility significantly beyond its 1997 volume of 120M cars would be expensive and complicated. There was no room for further building on the site and no available land adjacent to the plant. The proposed China facility would solve the capacity problems. However with the financial storm sweeping through Asia, some executives inside Mattel argued that they should reconsider building a new plant in Malaysia to concentrate die-cast production in a single country. Others felt that they should consider Indonesia as a way to take advantage of low labor costs and very attractive exchange rates. Mattel currently operated a plant in Indonesia that produced Barbie® dolls. Mattel had to decide whether Mattel should go forward with the new China plant, build a plant in Malaysia or Indonesia, expand one of the existing facilities, or outsource the surplus die-cast volume through VOA.

Company Background

Based in California, Mattel, Inc. designed, manufactured, and marketed a broad variety of toy products. The company's core product lines included Barbie fashion dolls, Hot Wheels die-cast toy vehicles, Cabbage Patch Kids, Fisher-Price preschool toys, and Disney toys. Most of these toys were made overseas, primarily in Southeast Asia. Mattel had wholly owned manufacturing facilities in China, Malaysia, Indonesia, Mexico, and Italy.

Mattel was founded in 1944 by Elliot and Ruth Handler. Neither Elliot nor Ruth had much business experience or capital, but they both had dreams. The post-World War II demographics of a huge baby boom plus a virtually toyless marketplace provided a unique opportunity to gain a place in a growing toy market. Mattel's first products, simple picture frames and doll house furniture, met with mixed success. The first really big hit was a music box. By partnering with another toy inventor, they developed a music box that could be mass-produced, dramatically reducing its cost. The product went on to sell more than 50 million units over the next 20 years. By 1955, annual sales reached \$5 million and the Handlers decided to take a gamble that would forever change the toy business. In what seemed at the time a risky investment, the Handlers signed a 52-week contract with ABC Television to sponsor a 15-minute segment of Walt Disney's Mickey Mouse Club at a cost of \$500,000—a sum equal to Mattel's net worth at the time. Up until this move, most toy manufacturers relied on retailers to promote their products. Prior advertising occurred only around the holiday season. The popular daily kids show made the Mattel brand well known among the viewing audience, translating quickly into sales. The success of the Handlers' pact with kids TV started a marketing revolution in the toy industry.

Mattel made toy industry history again in 1959 with the introduction of Barbie. Ruth Handler got the idea for the toy after watching her daughter play with adult looking paper dolls. In spite of the cool reception to the Handlers' teenage fashion doll at the 1959 New York Toy Fair, the early sales quickly signaled a winning product. With the success of Barbie, Mattel made its first public stock offering and by 1963 was listed on the New York Stock Exchange. In the next two years Mattel's sales skyrocketed from \$26 to \$100 million. The introduction of Hot Wheels miniature model cars in 1968 was another spectacular success making Mattel the world's largest toy company by the end of the decade.

Unfortunately, the Handlers' good fortune in the toy industry was quickly tarnished. Plagued by operational problems including a fire in their Mexican plant and shipping strikes that interrupted the flow of goods from Asia, Mattel's growth stumbled. In 1973, Mattel was caught issuing misleading financial reports. The SEC filed charges against the Handlers and a federal judge ordered Mattel to restructure the board, forcing the Handlers out. Under a new management team, Mattel regained profitability and started diversifying into other children's products including publishing and entertainment. At first the acquisitions looked promising, but poor performance during the 1980s forced Mattel to divest of many at steep losses.

By 1987, Mattel had fallen into even deeper trouble with heavy losses in video games. The stock had lost two-thirds of its value since 1982, forcing the board to appoint a new chairman—John Amerman, who had joined the company in 1980 as head of Mattel's international division. Amerman charted a new strategy for Mattel, closing 40% of the company's manufacturing capacity, including plants in California, Taiwan, and the Philippines. Most important, Amerman focused the company on its core brands such as Barbie and Hot Wheels, and by making selective investments in the development of new toys. The Barbie line was expanded to include approximately 50 different dolls per year with many new accessory items. A promotional campaign built around Barbie's 30th birthday in 1989 propelled her onto the cover of *Smithsonian Magazine*, confirming her status as a true American icon. The Barbie make-over was so effective that from 1987 to 1992 sales shot up from \$430 million to nearly \$1 billion, accounting for more than half of the company's \$1.85 billion in sales. At that time, Mattel estimated that 95% of all girls in the United States aged 3 to 11 owned Barbie dolls.

In 1991, a strengthened strategic alliance with The Walt Disney Company allowed Mattel to expand its development of Disney toys. Mattel negotiated the exclusive rights to sell dolls, stuffed characters, and preschool toys based upon such movie classics as the *Lion King*, *The Hunch Back of Notre Dame*, and *Hercules*. The agreement gave Mattel unparalleled exposure to more than 50 million children, parents, and grandparents. Then, in a deal lauded by Wall Street analysts, Mattel acquired Fisher-Price in 1993. Combining Fisher-Price's strength in the infant and preschool market with the power of Mattel's international distribution and marketing network, created a formidable global competitor.¹ Finally, the Tyco acquisition in

¹ Pendergast, Sara. "Fisher Price, Inc." *International Directory of Company Histories* (Volume 12, 1996): 167. Montgomery, Bruce P. "Mattel, Inc." *International Directory of Company Histories* (Volume 7, 1993): 304.

1997 boosted Mattel's 1997 revenue to \$4.8 billion and pushed Mattel past Hasbro making it the undisputed leader in the toy industry (see Exhibit 2).

Over the years, the ability to create new products and quickly meet demand remained nonnegotiable requirements for success in the toy industry. Manufacturers had to live with the reality that inventory in times of hot sales could reap large rewards, but often became worthless overnight. In 1997, Mattel introduced hundreds of new toy products. Many of the new toys reflected increased demand among core product lines—for example, the market's renewed interest in collectible Barbie and Hot Wheels products. Beyond core products, there remained a large, lucrative segment of non-core toys whose market life was typically less than one year. Many of these products were related to popular movie characters. More and more, filmmakers and toy manufacturers combined their efforts to market their products to the public. These were high turnover products where time to market was critical. Mattel typically produced core product lines in-house and outsourced the production of non-core lines to a network of vendors. Outside vendors gave Mattel the needed flexibility to handle hot products and the seasonal changes in toy sales. In the U.S., toy sales historically followed strong seasonal trends with nearly 45% of all sales in 1997 coming in November and December.

Miniature Car Market

Die-cast 1:64 scale miniature cars have been a long-standing favorite among children and adults. Matchbox cars were introduced by a small company founded in 1947 by two unrelated school friends, Leslie Smith and Rodney Smith. Few would have imagined that the company, Lesney Products, had created a term that would later become the generic name for any small toy replica of a car or truck. In 1982, the company met with financial difficulties and the Matchbox brand was sold to a Hong Kong-based holding company, Universal International which later became a subsidiary of Tyco Toys.

Mattel introduced Hot Wheels in 1968 and quickly became the market leader, often gaining market share while other companies lost market share, or worse, went bankrupt. By 1997 there were few major competitors in the 1:64 category other than Racing Champions® and Hasbro's Winner's Circle® which both focused primarily on replicas of racing cars including NASCAR. In Europe, both MIRA and Bburago competed with wider size offerings, producing cars at 1:43, 1:25, and 1:18 scale. Larger cars were often purchased by collectors and there were several other small Japanese and English companies that marketed high-end replicas.

While both 1:64 scale miniature car replicas, Hot Wheels and Matchbox competed in very different market segments (see Exhibit 3). Matchbox cars emphasized realism in both scale and detail. For years they had been manufactured entirely of metal, making them heavier and more durable. These elements made the car more appealing to younger children, typically 2-4 years old. Moreover, much of the Matchbox sales were outside of the U.S. while Hot Wheels were an American phenomena. Hot Wheels cars featured more fantasy designs both in form and decoration. With a larger creative element, they appealed to older children who participated in more imaginative play patterns.

Prior to 1994, sales of die-cast cars, including Hot Wheels, were relatively flat. However, over the course of the next three years, demand for the Hot Wheels skyrocketed to 155 million units in 1997 while Matchbox saw much slower growth. Mattel attributed much of the growth to a new rolling mix marketing strategy. Mattel sold its Hot Wheels cars to retailers in 72-car assortment packs. The “Assortment Pack” was more commonly referred to as the master carton. Stock keepers at various retail outlets shelved the individual Hot Wheels blister packs directly out of the 72-car master carton. In the past Mattel relied heavily on retailer’s POS data to help forecast future demand and determine what the actual assortment mix should be. Starting in 1994, Mattel incorporated a new marketing strategy to sell die-cast cars. Mattel determined that variety was the key driver of sales. If customers saw new products every time they went in the store, they were more likely to buy. The company implemented a rolling mix strategy that changed the physical 72-car assortment mix by 7-8% every two weeks. Over the course of a year the product line changed over two times entirely. This strategy developed an organized, non-reactionary method of new product introduction and old product obsolescence. New products varied from brand new “First Edition” cars, to redecorated models of cars already produced. By rolling the mix, Mattel was able to market a much broader range of SKUs without requiring any additional retail shelf space.

Mattel also found that it could educate the consumer and encourage buying patterns based on product introduction. Marketing began introducing “Series Cars”, a set of four cars sold individually and released every month. Each series would stay on the retailers’ shelves for five months and then be permanently discontinued. The strategy created urgency among consumers to buy the products while they were available. Series cars also helped promote the existing collector market. In addition, Mattel played to the collector market by introducing “Treasure Hunt” cars. These cars were only manufactured in lots of 20,000 and were extremely rare. One new Treasure Hunt car was made each month. They were randomly inserted into a retailer’s assortment pack. These cars made it into the hands of a lucky few and were highly prized as collectible items. In 1996, a limited number of Treasure Hunt assortment packs (all 12 cars) retailed at FAO Schwartz for \$150. A year later, the same assortment sold for over \$1,000 between collectors.

Through its rolling mix strategy Mattel no longer had to rely on POS data to forecast market demand for specific SKUs, but rather to plan the changes to the mix. Since Mattel guaranteed its retailers that the mix would sell, the retailers stocking problems were simplified to merely purchasing assortment packs and stocking the store shelves. Mattel believed it could incorporate the same strategy into the newly acquired Matchbox line and experience similar results (see Exhibit 4 for market forecasts of both Hot Wheels and Matchbox cars). No other manufacturer had the capability to offer consumers Mattel’s level of variety.

Mini-Vehicle Manufacturing

The manufacture of die-cast cars (DCC) involved well-defined production steps that could be performed either in-house or by third parties. Among die-cast manufacturers, there was a continuum in terms of the degree to which the processes and manufacturing steps were conducted in-house, as opposed to being subcontracted to other firms. While most firms had in-house die-casting, plastic injection molding, and basic painting and decorating processes,

there was wide variation for other processes, including electroplating, vacuum metalizing, and package printing.

In the first step, a press injected molten zinc into a mold to create the body of the vehicle and/or the chassis (unless one or both of those parts were plastic). Mattel made most of its own die-casting molds at a facility in Malaysia, but also outsourced them from firms in Hong Kong. Presses could be outfitted with two different types of molds—conventional or unit die. Conventional molds usually had one car body cavity or two chassis molds. Unit dies were smaller than conventional molds traditionally used in the die-casting process and they offered quick changeover. Most importantly two dies (or molds) could be fit into each machine. For every machine “shot”² two car bodies, four chassis, or some combination could be produced. Die-cast molds had a useful life of about 1.5 million shots, after which time the seams of the mold often began to leak creating excessive wasted zinc called “flash” and eroding the quality of the car.

The delivery of molten zinc could be machine specific (individual machines equipped with their own melting pots) or a more complicated central furnace and feeder system. The furnace and feeder system reduced energy costs associated with changing temperature settings on individual machine furnaces and maintained the zinc at a more uniform temperature, thus improving the cast quality.

The bodies and chassis were then removed from the press by the operator. Bodies and chassis would be separated from the excess metal that flowed through the mold ducts into the cavities. This excess metal would be removed and recycled. The bodies and chassis would then be deflashed, deburred, and polished by vibrating the parts with smooth ceramic stones in a large bowl for 30 minutes. This process removed all the unwanted metal while smoothing sharp edges and seams.

The decoration of the car involved an electrostatic application of base and top coat to the car body via a painting system. A common system was supplied by Ransburg and could be used to paint any metallic surface.³ Die-cast cars were attached by hand to a “tree” that hung from a conveyor line which carried the cars through the painting and drying processes. Each tree carried up to 72 cars. The trees themselves were spaced 16 inches apart and run at the conveyor speed of 7 feet per minute. On the other hand, chassis were electroplated to prevent corrosion and to maintain a shiny appearance.⁴ The electroplating process involved dipping the metal chassis in a series of chemical baths to deposit a thin layer of shiny metal.

After applying the base color, additional decorations were applied to the car body and other parts using a “tampo” machine. Aside from the zinc weight of a die-cast vehicle, the major source of variance in the cost⁵ of a car was the number of tampo operations the car under-

² Shots refer to each time molten zinc is pressed into a mold cavity, allowed to cool, and released into a waiting bin. Shot times for 35T die cast machines were 9-10 seconds each.

³ Ransburg and other electrostatic painting systems are used in many industries including the automobile industry, to paint metal products.

⁴ Many mini-vehicles, including many Hot Wheels cars, had plastic chassis in order to reduce zinc cost, and thus did not use electroplating.

⁵ The number of moving parts, i.e., moving doors and hoods, can also affect cost significantly. Most of

went. Each “hit” by a tampo machine added one color to one surface of the car. Highly decorated cars with dozens of colors, like NASCAR replicas or highly detailed collectibles, tended to cost more than vehicles with fewer colors and decorations. The determination of how much decoration to apply to a product was purely a marketing decision.⁶ Standard Hot Wheels and Matchbox cars typically sold for under \$1.00 in U.S. retail stores, while NASCAR and other collector edition cars were usually priced at \$3.00 or more.

In addition to die-cast parts, most mini-vehicles included plastic injection-molded parts, notably the interior, the windows, the wheels and sometimes the chassis. These parts were produced on conventional plastic injection molding machines that were commonly used to produce other small plastic toys as well as thousands of other products. As with die-cast machines, there were many types and sizes of plastic injection molding machines. Plastic injection molds typically had 2 cavities per mold and a useful life of about two million shots.⁷ 70 ton injection mold machines would be required to produce plastic chassis, windshields, interiors, engines, etc. 110 ton machines were needed to produce the wheel components. Each car required one wheel mold and an average of 2.5 molds for other plastic parts⁸. Wheels were typically produced on a 32-cavity mold. Cycle time for the 70 and 110 ton injection mold machines was typically 16 and 20 seconds respectively.

Plastic parts were sometimes finished using vacuum metalizing (VUM) to impart a silvery metallic sheen to the parts. The plastic parts were first painted with a base coat of lacquer. Next a thin film of metal was applied to the plastic parts by ionizing lengths of tungsten metal in a vacuum chamber. One system would typically satisfy all volume demand up to 100 million units of production and cost approximately \$1.2 million. While some Hong Kong vendors had electroplating systems, most would choose not to purchase VUM systems, but rather outsource that process for the relatively few vehicles having VUM parts. After VUM, the plastic bodies would be given a top coat of clear lacquer to preserve the finish. If a colored metallic was desired, the clear coat could be dyed (for example red or gold).

After molding, wheels were decorated in a hot stamping process used to apply the metallic appearance to the hub cap area of the plastic wheels. The assembly of the wheels and axles, called the “barbell” assembly, was traditionally performed by hand. Because Mattel’s Malaysia factory was located in a relatively high labor cost area, Mattel had developed machines to automatically insert the pins into the wheels to form the barbell assembly. This process was unique to Mattel.

The assembly of the various pieces of the vehicle into a final product was performed manually by unskilled labor. This operation often involved conveyor belt systems, or small 2-

the basic vehicles produced by Mattel did not have moving parts.

⁶ As a marketing ploy, Matchbox enclosed an unpainted, untrimmed “first shot” car in the same box with the corresponding, finished collectible to illustrate the “before and after” effect of decorating the car.

⁷ Most plant processes were planned to run one 8-hour shift per day, however, both the injection molding and die casting processes would run three 8-hour shifts. Production calculations for the three shift processes used a 22-hour day, or 7.3-hour shift, to account for downtime and breaks.

⁸ This figure varies from car to car. The engineering standard for Hot Wheels averaged 2.5 molds per car.

6 person manufacturing cells, where the main piece of equipment employed was a device that fastened the body and chassis of the car together (a process called “staking”) after it was manually assembled.

Packaging the product, usually in blister packs, was often carried out at the manufacturing facility. Most vendors had heat sealant machines which sealed plastic blisters to pre-printed “blister cards,” and used those devices to package a variety of other toys and products in addition to mini-vehicles. The printing of the blister cards or other packaging, and the vacuum forming of the blister was often outsourced, but could be performed in-house, depending on a vendor’s preference.⁹

The process of manufacturing a mini-vehicle was labor intensive and involved machine production processes that were, for the most part, modular in nature. Operating in low labor cost countries like China or Malaysia, labor cost typically represented 10-20% of the product cost. With the possible exception of the Ransburg painting system (and the more rarely used electroplating and VUM systems) most segments of the production process could be expanded incrementally as needed, without creating significant excess capacity at any step in the process or requiring significant capital expenditures. In fact, whether a vehicle was all plastic or part die-cast metal and part plastic, the production process was generally not susceptible to large economies of scale—aside from the usual economies associated with spreading facility and plant management costs over a large number of products. Mattel’s own experience as well as that of the vendors Mattel had engaged, demonstrated that multi-product production was sufficient to obtain much of the possible production economies. Aside from facility and management overhead costs, most of the mini-vehicle production process could be described as proportional to the incremental machinery that was added to the plant as production needs increased. Transportation costs from Asia to Los Angeles varied between \$3,000-\$4,000 for a shipping container that could hold up to 300,000 cars.

Vendor Operations

VOA was the outsourcing arm of Mattel, Inc. Ron Montalto and his personal assistant started operations in 1988 with very little capital and a lot of faith. The vendor concept was initiated following an extensive competitive study by McKinsey and Company. The study recommended that Mattel differentiate between core and non-core products, manufacturing its core products in-house and outsourcing all non-core products. Mattel originally decided that its Barbie and Hot Wheels products were core. In the following years, the company added selective Disney and Fisher Price lines to the list. Non-core products tended to be promotional items, or toys with short life cycles that were often introduced together with a children’s television series (examples include “The Mighty Ducks” and “Street Sharks”). Non-core toys experienced the fashion-like demand typical in the toy industry.

In 1997, VOA employed over 400 staff and generated sales revenues in excess of \$1.4 billion. The group operated through a network of approximately 35 vendors that were contracted to manufacture Mattel products. Vendors were typically registered Hong Kong

⁹ A new vacuum forming machine cost approximately \$105,000.

companies with manufacturing facilities and political expertise in mainland China. VOA selected vendors to produce new toys based on expected time to market, a vendor's manufacturing competence, unique process capabilities, and price.

VOA enabled Mattel to produce a large number of short life-cycle toys without the capital commitments required in wholly owned manufacturing. Moreover, it enabled Mattel to push certain risks onto its suppliers. These risks included demand variability and product diversity. Supplier metrics were based on the ability to produce high quality goods at a competitive price, and to deliver them to end-users on-time. Toy sales were directly related to the number of new product introductions and speed to market. In recent years, Mattel had introduced roughly 300 new, non-core toys each year.

The strength of VOA rested on its vendor relationships. Mattel was a marketing driven company that demanded high product quality and precise design conformance. Mattel's organization had been challenged for almost a decade to help individual vendors develop the internal capabilities necessary to satisfy Mattel's standards. It was an ongoing process that spanned multiple types of manufacturing, from the assembly of plush toys (like Winnie-the-Pooh) to the fabrication of technology goods such as children's tape recorders and cameras (sold under the Fisher-Price brand).

The new toy development process began at Mattel's corporate headquarters in California. Design teams created a *Bid Package* that contained the new product's blueprint, engineering specifications and often a physical model. The Bid Package was sent to VOA for vendor quotation and selection. After a vendor had been selected *Tool Start/Debug* began. Each new toy required a set of tools for manufacture. The most common tools were hardened steel molds used in plastic injection and die casting. Shortly after *Tool Start* came *Tool Let*. This was a scheduling milestone and was considered day one of the production process. *Tool Let* was the point at which Mattel assumed liability for the tooling costs. Tooling costs varied considerably based on the complexity of the toy—tool sets for past toys ranged from \$50,000 to \$2,000,000. After the tools were completed, the production process began. Step one, or *First Shots* (FS), was typically a run of 50 units to determine what mold/process modifications were required. This was also the point at which a commitment date by the vendor was established. Step two or, *Engineering Pilot* (EP), was for touch-up. There could be a second or third EP if necessary depending on the toy's complexity. Step three was the *Final Engineering Pilot* (FEP) that established complete test durability. Step four was *Production Pilot* (PP); typically 1,000 units were run at this stage and the manufacturer used the entire assembly line to run the product. When the new toy met design compliance, step five, *Production Start* (PS) began.

Current Production Options

MMSB

Located in Penang, Mattel Malaysia Sdn Bhd (MMSB) was the only Mattel facility that manufactured Hot Wheels vehicles. Mattel acquired the plant from GEC (of the UK) in September 1980. At the time of its acquisition, the plant was an 80,000 square foot facility

used to manufacture TV sets. Mattel began production at MMSB in January 1981. Total start-up costs amounted to approximately \$5 million (in 1980 dollars), and production volume at MMSB for the first two to three years averaged 30 to 35 million mini-vehicles per year. In 1984, Mattel added 180,000 square feet to the plant and began manufacturing male action figures. The plant was again expanded in 1994 by an additional 5000 square feet.

In 1996 the plant was dedicated to mini-vehicle production providing a significant capacity expansion. The 1996 expansion effectively used up the available space for die-cast car production at MMSB, resulting in Mattel's determination in June of 1996 to begin outsourcing incremental mini-vehicles requirements (11 million vehicles in 1996) from vendors in China. China vendors provided nearly 35 million vehicles to Mattel in 1997 and were expected to provide between 40 and 50 million vehicles in 1998. Throughout 1997 Arun Kochar, VP and plant director, worked to increase MMSB capacity by improving the production process. By the end of the year, MMSB was producing over 10 million units per month, based on two shifts per day, six days a week. Kochar felt that another 10-20% improvement might be possible in 1998, but doubted further sustainable increases could be achieved.

Labor at the Malaysian plant was very productive with high quality output. As compared with other poorer countries in East Asia, labor in Penang was more skilled and expensive. The higher skill translated into a high quality product and allowed Mattel the flexibility needed to support the rolling product mix that changed weekly. Unfortunately, the labor market was getting tight. To keep a steady flow of labor, Kochar had to regularly recruit workers from the small towns in the countryside. Workers were predominantly young women, many of whom stayed in Mattel furnished housing. Mattel was very sensitive to labor conditions and often over compensated both in age requirements and working conditions. For example, the plant had recently installed air conditioning to increase worker comfort, yet very few workers had air conditioning in their own homes.

Bangkok

Under Tyco, the manufacturing of Matchbox toys was divided between two factories, one in Bangkok and one in Shanghai (Shanghai Universal Toy Company or SUTC). Excess demand beyond the capacity of these two plants was outsourced to a pool of south China vendors. Over recent years, Tyco management led by Rug Burad (VP of Tyco Manufacturing) had been gradually phasing out much of the Bangkok plant's production due to management costs and poor quality. Many of the conventional molds used to produce Matchbox cars had been moved to Shanghai. When Mattel took over the partnership position in Bangkok, the factory was producing only 21 million units in a building that could accommodate equipment and workers for production of 50 million units. The Matchbox plant was brought under the management of Kochar. Much of the remaining equipment was old and the presses were equipped to handle only conventional molds. Retrofitting the machines to accept unit dies would be expensive. Since Hot Wheels were made almost exclusively with unit dies, the plant could not effectively take on Hot Wheels volume without further investment. Labor costs in Thailand were half of Malaysia but labor productivity was significantly lower.

Shanghai

SUTC carried the bulk of Tyco's die-cast car production, producing 33 million Matchbox units in 1997 with about 1000 workers. The die-cast presses were operating at full capacity and further expansion would require significant equipment investment. The plant not only offered Mattel a production facility but also a domestic distribution license. This nontransferable license enabled Mattel to sell die-cast cars in China as long as it continued operating SUTC at its original location. In 1997, total vehicle sales in China was about three million units. Since the cars were inexpensive and durable, many inside Mattel felt that the market could grow significantly as Chinese parents increased their toy purchases. Closing or relocating the plant would jeopardize the distribution agreement. Moreover, if Mattel closed the plant, it would be forced to pay the Chinese government \$5000/employee in severance. Nevertheless, Montalto was concerned with SUTC's fit with Mattel's future manufacturing strategy. One of the main problems was the minority share partnership position Mattel inherited from Tyco. In addition, the quality standards at SUTC were far below any Hot Wheels producing facility. Strategically within China, Shanghai made a poor location choice for a toy manufacturer because of the city's emphasis on developing technology-based industries and its relatively high labor cost (over \$1.00/hour). Labor productivity was about one half of that in Penang. As with Bangkok, the plant employed conventional molds, which would require retrofitting the machines to accept unit dies.

VOA

Ideally Mattel could outsource die-cast production until its own facilities were established. However, the one area where VOA had not developed extensive vendor capabilities was in die casting. There were very few South China vendors in the die-cast business and fewer still that could produce high quality products. One notable firm was Zindart—a Hong Kong company that had been recently listed on the NASDAQ exchange. Die-casting was a cruel business that required large capital investments and offered meager returns. For a vendor to be able to produce Mattel quality cars, a large capital investment (between \$10 and \$30 million) was required. Montalto found it exceedingly difficult to persuade his vendors to take on this new business and the risk associated with it. Montalto worried that there just wasn't enough high-quality, die-cast capacity in the vendor base to meet the Matchbox demand.

New Plant Options and the Currency Crisis

By the summer of 1997, Mattel was close to a decision to build a new plant in Southern China to handle the increased demand for Hot Wheels and to consolidate Matchbox production. Labor in the Guangzhou region was cheap and plentiful. Including benefits such as dormitories and educational programs the fully loaded rate was less than \$0.50/hour (see Exhibit 5). To avoid mainland China's 21% import duty on capital equipment, Mattel planned to locate the facility in one of the special Industrial Zones. The most promising site under consideration was located in the Guangzhou Baiyun Industrial Zone. The Baiyun zone was in Luogang township, east of Guangzhou. It was 12 miles from Baiyun International Airport and 3 miles from Huangpu New Harbor. A medium-sized cargo railway station was located in the zone.

Based on estimates from MMSB, the single story facility required about 325,000 square feet to accommodate 100 million units of production per year. Contractor quotes for building the factory shell were \$10 per square foot. Bringing the shell to usability in terms of water pipes, telephone lines, electrical wiring, etc. was conservatively estimated at 50% of the shell's cost. Mattel would also be responsible for building dormitories to house the factory workers. Dormitories would each have six floors (maximum height without elevators) and approximately 2500 square feet per floor. Based on its other manufacturing sites in South East Asia, Mattel was committed to providing a minimum of 40 square feet of living space per direct labor employee. Staff labor would require a minimum of 100 square feet per employee.

The idea of building the China plant had been analyzed for nearly a year. By July, Montalto's team had developed a capital expenditure request that was circulating at the corporate headquarters in California. The plan included three options for the initial size of the plant (50, 100, 150M cars). It appeared that one of the options would certainly be approved and that construction would commence in the beginning of 1998, with first production in 1999. Then overnight the environment changed. Starting with South Korea and spreading quickly throughout the region, plunging currencies and stockmarkets turned the fast growing Asian economies on their ears. It happened so quickly that companies like Mattel were caught by surprise. Reflecting on the rapid changes, the *Economist* lamented,

If anybody had predicted a year ago that Indonesia, South Korea and Thailand would have to go cap in hand to the IMF, they would have been thought mad. This was, after all, the East Asia whose economic policies the international financial community was forever applauding: a world away from Latin America or Africa, where trouble was always on the cards.¹⁰

By January, many of the East Asian currencies had been sharply devalued (see Exhibit 6). Yet China, whose currency was not fully convertible and thus fixed by the central government, held steadfast. Thus, in relationship to other countries in the region, China no longer looked as inexpensive and the plant decision was back out on the table at Mattel.

Indonesia

With the rapid devaluation of Indonesia's currency, some inside Mattel felt it should be considered again as possible site for a new plant. Indonesia had very low labor rates and was thus suitable for high labor products. Because of this, Mattel had already built a doll factory in Jakarta in 1996. The reduction in currency value had made the labor even cheaper (as long as inflation did not kick up). However, labor productivity was low and managers at Mattel felt it was unlikely that productivity levels could ever be improved to Malaysian levels. Earlier investigations had identified Surabaya as a possible plant site where the costs of building a plant were similar to those in China. In addition to standard return on investment criteria, Mattel was also trying to diversify risk. There was inherent volatility in dealing with third world countries, due to both internal changes in regulations and external pressures. Adding Indonesia gave Mattel a diversification advantage its competitors didn't have, while

¹⁰ "Frozen Miracle," *Economist*, March 7, 1998.

at the same time allowing the company sufficient economic leverage to maintain some influence with local governments. In principle, these same advantages would apply to a new die-cast facility. In addition, Mattel's experience in running an operation in Indonesia would be a significant advantage when starting up a new facility. However, Indonesia's government was under intense public reproach and it was not clear if the long-time president could survive the crisis.

Malaysia

Another possible site for a new plant was in Kuala Lumpur (KL), Malaysia. Mattel already had a doll factory in KL and the existing die-cast plant in Penang. Adding another die-cast facility in KL would offer the company single country manufacturing and greater managerial control. Economies of scale would come in the form of internal tool production and inter-plant exchange, management staff, material input costs, and distribution. In addition, the labor population in Malaysia was, on average, more productive than anywhere else in Southeast Asia. There were two downsides to making KL a future plant site—labor availability problems and higher labor costs.

What Next?

Montalto was confident that the Marketing Department's demand forecasts were accurate, especially under the moderate growth scenario. The increased demand for mini-vehicles was expected to come in significant part from Europe where Mattel was re-launching Hot Wheels products after previously unsuccessful marketing attempts. Mattel desperately needed additional die-cast capacity and it was Montalto's job to recommend a way to find it. He wondered if, strategically, it made sense to continue treating die-cast cars as a core product. And was Matchbox core to Mattel? The fastest way to increase production would be to expand capacity in the existing Mattel facilities. Since Mattel produced Matchbox cars in Bangkok and Shanghai, either one of these factories could be expanded to accommodate more production. The other expansion option concerned VOA itself and the amount of core business Mattel wanted to outsource. A longer-term solution would be to build new capacity, but the question remained where? Malaysia, Indonesia and China were all viable alternatives for a new die-cast factory.

Exhibit 1: Current and Potential Die-Cast Plant Locations



Exhibit 2: Mattel Financial Information

(In thousands, except per share amounts)	CONSOLIDATED STATEMENTS OF INCOME		
	For the Year		
	1997	1996	1995
NET SALES	\$4,834,616	\$4,535,332	\$4,369,816
Cost of sales	2,434,616	2,315,574	2,302,076
GROSS PROFIT	2,400,000	2,219,758	2,067,740
Advertising and promotion expenses	779,139	778,919	731,746
Other selling and administrative expenses	796,952	772,335	721,362
Restructuring and integration charges	275,000	-	8,900
Interest expense	90,130	100,226	102,983
Other expense (income), net	33,697	31,522	(1,919)
INCOME BEFORE INCOME TAXES AND EXTRAORDINARY ITEM	425,082	536,756	504,668
Provision for income taxes	135,288	164,532	166,779
INCOME BEFORE EXTRAORDINARY ITEM	289,794	372,224	337,889
Extraordinary item - loss on early retirement of debt	(4,610)	-	-
NET INCOME	285,184	372,224	337,889
Preferred and preference stock dividend requirements	10,505	7,391	6,542
NET INCOME APPLICABLE TO COMMON SHARES	\$ 274,679	\$ 364,833	\$ 331,347
BASIC INCOME PER COMMON SHARE			
Income before extraordinary item	\$ 0.96	\$ 1.26	\$ 1.13
Extraordinary item - loss on early retirement of debt	(0.01)	-	-
Net income	\$ 0.95	\$ 1.26	\$ 1.13
Average number of common shares	295,450	290,393	293,312
DILUTED INCOME PER COMMON SHARE			
Income before extraordinary item	\$ 0.94	\$ 1.23	\$ 1.11
Extraordinary item - loss on early retirement of debt	(0.01)	-	-
Net income	\$ 0.93	\$ 1.23	\$ 1.11
Average number of common and common equivalent shares	295,653	303,057	298,763
DIVIDENDS DECLARED PER COMMON SHARE	\$ 0.27	\$ 0.24	\$ 0.19

Consolidated results for all periods have been restated retroactively for the effects of the March 1997 merger with Tyco, accounted for as a pooling of interests.

CONSOLIDATED BALANCE SHEETS

(In thousands)	December 31, 1997	December 31, 1996

ASSETS		
Current Assets		
Cash	\$ 694,947	\$ 550,271
Accounts receivable, less allowances of \$30.7 million at December 31, 1997 and \$21.0 million at December 31, 1996	1,091,416	948,940
Inventories	428,844	444,178
Prepaid expenses and other current assets	246,529	195,673
	-----	-----
Total current assets	2,461,736	2,139,062
	-----	-----
Property, Plant and Equipment		
Land	29,556	30,864
Buildings	198,396	216,523
Machinery and equipment	453,978	438,969
Capitalized leases	24,625	26,512
Leasehold improvements	68,179	69,732
	-----	-----
	774,734	782,600
Less: accumulated depreciation	336,946	323,096
	-----	-----
	437,788	459,504
Tools, dies and molds, net	163,809	156,777
	-----	-----
Property, plant and equipment, net	601,597	616,281
	-----	-----
Other Noncurrent Assets		
Intangible assets, net	542,759	611,410
Sundry assets	197,699	214,389
	-----	-----
	\$3,803,791	\$3,581,142
	=====	=====

(In thousands, except share data)	December 31, 1997	December 31, 1996

LIABILITIES AND SHAREHOLDERS' EQUITY		
Current Liabilities		
Short-term borrowings	\$ 17,468	\$ 28,924
Current portion of long-term liabilities	13,659	106,596
Accounts payable	310,117	312,378
Accrued liabilities	629,445	510,691
Income taxes payable	202,735	183,288
	-----	-----
Total current liabilities	1,173,424	1,141,877
	-----	-----
Long-Term Liabilities		
6-3/4% Senior Notes	100,000	100,000
10-1/8% Senior Subordinated Notes	-	126,500
Medium-Term Notes	520,500	220,000
Mortgage notes	43,573	47,600
Other	144,224	139,242

Total long-term liabilities	----- 808,297 -----	----- 633,342 -----
Shareholders' Equity		
Preferred stock, Series B \$1.00 par value, \$1,050.00 liquidation preference per share, 53.6 thousand shares authorized, issued and outstanding in 1996	-	54
Preferred stock, Series C \$1.00 par value, \$125.00 liquidation preference per share, 772.8 thousand shares authorized; 771.9 thousand and 772.8 thousand shares issued and outstanding in 1997 and 1996, respectively	772	773
Common stock \$1.00 par value, 600.0 million shares authorized; 300.4 million and 296.1 million shares issued in 1997 and 1996, respectively	300,381	296,091
Additional paid-in capital	509,172	518,296
Treasury stock at cost; 8.8 million and 8.1 million shares in 1997 and 1996, respectively	(285,420)	(215,999)
Retained earnings	1,490,804	1,293,653
Currency translation and other adjustments	(193,639)	(86,945)
Total shareholders' equity	----- 1,822,070 -----	----- 1,805,923 -----
	\$3,803,791	\$3,581,142
	=====	=====

Consolidated results for December 31, 1996 have been restated retroactively for the effects of the March 1997 merger with Tyco Toys, Inc. ("Tyco"), accounted for as a pooling of interests.

Exhibit 3: Hot Wheels and Matchbox Products



Exhibit 4: Market Projections

		Hot Wheels and Matchbox Demand Forecasts (in millions of units annually)									
		Moderate Growth		1998		1999		2000		2001	
Total	Total			237		256		276		299	
	HW MB	169	68	184	72	200	76	218	81		

Exhibit 5: Labor Rates in July 1997

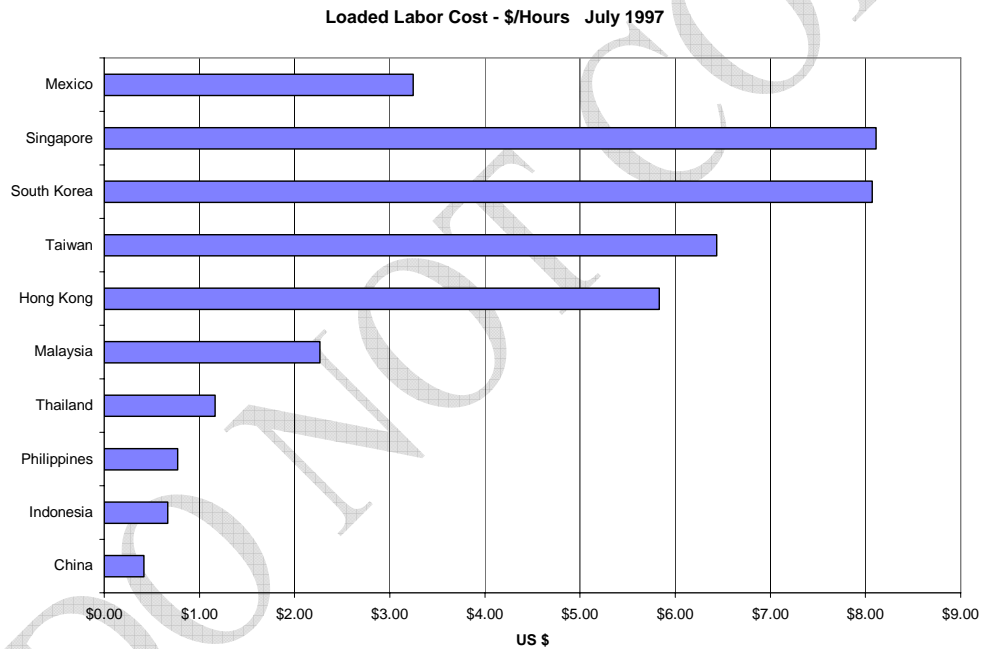


Exhibit 6: Exchange Rates

