which was purchased in China and Korea) were purchased from DuPont, whose licensees in Hong Kong, Taiwan, Korea, and China could provide them within two weeks. At the beginning of each year, Obersport gave DuPont an estimate of its annual requirement for each type of insulation.

Obersport also had to ensure the availability of a variety of other components such as D-rings, buckles, snaps, buttons, zippers, pull-strings with attached castings, and various labels and tags. Buckles, D-rings, pull-strings, and buttons were procured locally in Hong Kong and had a 15- to 30-day lead time. Many snaps were purchased from German vendors; since snap lead times were long, Obersport kept an inventory of snaps and dyed them locally as needed. Labels and tags had short lead times and were relatively inexpensive; Obersport generally carried excess stock of these materials.

Most zippers were purchased from YKK, a large Japanese zipper manufacturer. Obersport used a wide variety of zipper types each year. Zippers varied by length, tape color, and slider shape as well as the gauge, color, and material of the zipper teeth. Approximately 60 percent of Obersport's zipper requirements were sourced from YKK's Hong Kong factory, where standard zippers were manufactured. The lead time for these zippers was 60 days. The remainder was nonstandard zippers, which were sourced from Japan with at least 90-day lead times—sometimes longer. YKK required a minimum order quantity of 500 yards if the dyeing color was a standard color from its catalog; if not, the minimum order quantity was 1,000 yards. All production materials were received by Obersport; materials for any given style were then collected and dispatched to the factory where the particular style was to be cut and sewn. Obermeyer products were produced in a number of different factories in Hong Kong and China.

Cut and Sew

A typical Obermeyer product required many cutting and sewing steps. (Table 3-15 shows the sequence of sewing operations for the Rococo parka.) The allocation of operations to workers differed from one factory to another depending on the workers' level of skill and the degree of worker cross-training. Workers in Hong Kong worked about 50 percent faster than their Chinese counterparts. In addition to being more highly skilled, Hong Kong workers were typically trained in a broader range of tasks. Thus, a parka line in Hong Kong that required 10 workers to complete all operations might require 40 workers in China. Longer production lines in China led to greater imbalance in these lines; hence, a Hong Kong sewer's actual output during a given period of time was nearly twice that of a Chinese worker. (See Table 3-16 for a comparison of Hong Kong and China operations. The cost components of the Rococo parka, which was produced in Hong Kong, are shown in Table 3-17. Table 3-18 shows the estimated cost of producing the Rococo in China. Obermeyer sold the Rococo parka to retailers at a wholesale price of $112.50; retailers then priced the parka at $225.)

Workers were paid on a piece-rate basis in both China and Hong Kong: the piece rate was calculated to be consistent with competitive wage rates in the respective communities. Wages in China were much lower than in Hong Kong; an average sewer in a Guangdong sewing factory earned US$0.16 per hour compared with US$3.84 per hour in the Alpine factory in Hong Kong.

Workers in Hong Kong were also able to ramp up production faster than the Chinese workers. This ability, coupled with shorter production lines, enabled the Hong Kong factory to produce smaller order quantities efficiently. For parkas, the minimum production quantity for a style was 1,200 units in China and 600 units in Hong Kong.

Obermeyer produced about 200,000 parkas each year. The maximum capacity available to the company for cutting and sewing was 30,000 units a month; this included the production capacity at all factories available to make Sport Obermeyer products.

Obersport was responsible for monitoring production and quality at all subcontractor factories. Workers from Obersport inspected randomly selected pieces from each subcontractor's production before the units were shipped to the United States.

PRODUCTION PLANNING

Wally's immediate concern was to determine an appropriate production commitment for the first half of Obermeyer's projected demand for the 1993–1994 season. He had estimated that Obermeyer earned 24 percent of wholesale price (pre-tax) on each parka it sold, and that units left unsold at the end of the season were sold at a loss that averaged 8 percent of wholesale price. Thus, for example, on a parka style such as the Rococo, which had a wholesale selling