

- 5 A local manufacturer of wire harnesses is considering merging its three production facilities located in the same county into one new facility. Using the centroid method, determine the best location for the new facility. It is fair to assume a linear relationship between amount shipped and shipping costs.

The plan matrix is shown below with coordinates:

LOCATION	COORDINATES	UNITS PER YEAR
Jasper	150, 100	6500
Huntingburg	100, 400	7500
Celestine	300, 350	8000

- 6 Whirlpool Appliances produces refrigerators in Los Angeles and Detroit and supplies refrigerators to customers in Houston and Tampa. The costs of shipping a refrigerator between various points are listed below. Los Angeles can produce up to 2,900 units and Detroit up to 2,000. Determine how to best use your Los Angeles and Detroit capacity to minimize shipping costs.

FROM/TO	UNIT SHIPPING COSTS				
	LA	DETROIT	ATLANTA	HOUSTON	TAMPA
LA		\$140	\$100	\$90	\$225
Detroit	\$145		\$111	\$110	\$119
Atlanta	\$105	\$115		\$113	\$78
Houston	\$89	\$109	\$121		
Tampa	\$210	\$117	\$82		

- 7 The Peoples Credit Union has two check processing sites. Site 1 can process 10,000 checks per day, and site 2 can process 6000 checks per day. The credit union processes three types of checks: business, salary and personal. The processing cost per check depends on the site, as listed below. Each day 5000 checks of each type must be processed. Determine how to minimize the daily cost of processing checks using Excel.

	BUSINESS	SALARY	PERSONAL
Site 1	\$0.05	\$0.04	\$0.02
Site 2	\$0.03	\$0.04	\$0.05

CASE: RELOCATION OF 'TATA NANO' MANUFACTURING PLANT

Site selection in India is often dominated by tax incentives provided by different state governments. Many times, political reasons dominate the location decision of Government projects; for example, many Indian Railways projects are located at a particular place due to political compulsions. One of the most talked about plant re-location problem of recent years is that of shifting of Tata Nano plant from 'Singur' in West Bengal, India.

Tata Nano, an ambitious family-car project from Tata Group, is aimed at providing world's cheapest car to the consumers. Its manufacturing facilities were originally set up in Singur to avail the financial



subsidies, tax holidays, etc. Land availability and its low-cost, cheap labor, raw material availability, etc. were other governing factors in site selection for the low-cost manufacturing.

Singur, a small village in the state of West Bengal, was selected as the site, which required over 1000 acres of land. However, political disagreements started growing up soon from opposition political party and the hostility from local communities became unmanageable for Tata Group. Tata Motors eventually had to pull out its Rs. 2,000-crore project from Singur despite the fact that it had already suffered a loss to the tune of about Rs. 500 crore.

Many other state governments came up with lucrative proposals to attract Tata Nano project after its re-location. State of Kerala, Jharkhand, Orissa, Andhra Pradesh, Gujarat, and even countries like Sri Lanka came out with their attractive proposals. However, Sanand in Gujarat could make it because of various factors such as political stability, availability of economical land and labor, proximity to ports (benefits for both exports and imports), financial incentives like tax holiday for first 10 years, etc. According to Mr. Ratan Tata, "The group had opted for Gujarat because it had already lost a lot of time (in the Singur controversy) and urgency was the need of the day... We had an urgency to move to a new location... the 'reputation of Gujarat' and the 'speed' at which provisions were made, forced us to opt for Gujarat." Sanand is located at a distance of 40 km from Ahmedabad. It is very close to ports like Rajkot as well as Mundra, which is an advantage for export².

There is no doubt that West Bengal's loss is Gujarat's gain. Tata's decision to re-locate was based on minimization of the future losses and salvation of the existing situation in the best possible manner. Captains of Indian corporate world have learnt their lesson—without socio-political stability, industrial growth is a distant dream.

QUESTIONS

1. What were the major reasons for Tata's decision to start Nano factory at Singur and why was it re-located?
2. What is the latest status of Nano's production and distribution system?
3. Pick up five recent industrial projects. What were the criteria for facility location?
4. Why is Bangalore a preferred location for software companies in India?

REFERENCES

1. "India: Modi Wins as Gujarat Gets Tata's Nano Plant" *Business Week*, available on http://www.businessweek.com/globalbiz/content/oct2008/gb2008108_390634.htm (accessed on 24 April 2010).
2. 'Tata Nano's Plant in Sanand', available on Corporate Website of Tata Nano <http://www.tatanano.in/tata-nano-plant-in-sanand.html> (accessed on 24 April 2010).

CASE: APPLICHEM—THE TRANSPORTATION PROBLEM

Applichem management is faced with the difficult problem of allocating to its customers the capacity of manufacturing plants that are located around the world. Management has long recognized that the manufacturing plants differ greatly in efficiency but has had little success in improving the operations of the inefficient plants. At this time, management has decided to focus on how best to use the capacity of its plants given the differences in manufacturing costs that currently exist. They recognize that this study may result in the significant reduction of output or possibly the shutting down of one or more of the existing plants.

Applichem makes a product called Release-ease. Plastics molding manufacturers use this chemical product. Plastic parts are made by injecting hot plastic into a mold made in the shape of the part. After the plastic has sufficiently cooled, the fresh part is removed from the mold and the mold is then reused to make subsequent parts. Release-ease is a dry powder, applied as part of the manufacturing process, that makes it easy to remove the part from the mold.

Applichem has made the product since the early 1950s, and demand has been consistent over time. A recent study by Applichem's market research team has indicated that demand for Release-ease should be fairly steady for the next five years. Although Applichem does have some competition, particularly in the European markets, management feels that as