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**Co-Workers Across the Ocean**  
**- On-Site Assembly -**

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All vehicles manufactured and exported by Kinki Sharyo are not in finished state. In our U.S. projects, we must conduct the final assembly of vehicles on site, to comply with the Buy American Law. Also, some customers request us to deliver semi-finished vehicles, to allow the on-site installment of locally procured parts on them. On-site assembly is required in various other cases. For example, Egypt demands that the assembly of car structure parts and subsequent works should be executed by a local manufacturer, to promote the domestic production of rail vehicles.

Also, on-site assembly is occasionally executed because parts procured overseas have not been delivered by the time of the delivery of vehicles from Kinki Sharyo's factory, or because an additional work need be performed on the site as a result of a design change etc.

This chapter discusses early cases of on-site final assembly (FA), and another case of FA for cost reduction. I experienced all these works as a member of the respective project staff.

**Boston Project (from 1986) for MBTA**



This project, involving the export of vehicles to the U.S., was the first one of its kind awarded to Kinki Sharyo, and therefore everything in the project was new to us. To bid for the project, we formed a business partnership with SIG, a Swiss firm; and carried out design and other tasks by drafting specifications that were far more detailed than comparable ones intended for a domestic user. At first, we received an order for 50 vehicle units, with an additional 50 units as an option. The project was unconventional in that to count the number of vehicles, individual vehicles were not used as units; rather, individual articulated cars consisting of two vehicles (or boxes) were used as units, with coupled

boxes referred to as vehicles A and B. Therefore, we had to manufacture 100 boxes to meet the order for 50 units.

We then proceeded to the completion of a prototype vehicle, and to the delivery of semi-finished production model vehicles to the U.S. The vehicles were transported from a U.S. port to Boston by truck.

It had been decided to conduct final assembly at a rental factory in the suburbs, under the supervision of Enprotech (a joint venture established by Kinki Sharyo and Itochu Corp.). I and other staff members from Kinki Sharyo had been dispatched to the site to provide technical guidance. Since there were no local workers who had any experience of assembling rail vehicles, we had to train workers from the scratch, regarding all tasks involved. A work manual had been prepared beforehand to provide this training. The manual, featuring many illustrations, was the work of a Kinki Sharyo employee who had studied the method of three-dimensional drawing using a correspondence course. Later, techniques used for the production of the manual helped our company draft domestic work standards that were easy to understand for workers.

To prepare for this assignment, I took a quick-learning course at an English conversation school. Even so, I still found it difficult to communicate smoothly with local workers at the beginning of technical guidance. However, as people is people everywhere, I somehow attained a level of communication at which I could manage to make myself understood with the help of much gesturing. The joy I felt at this attainment surpassed any sense of accomplishment I had felt in comparable guidance sessions in Japan. Also, friendship grew between me and the workers, and a sense of shared mission among members of my team. This allowed us to solve various problems through cooperative efforts.

Looking back on the Boston project, I now see it as a pleasant and valuable experience. Shortly before returning to Japan after the end of my mission, some workers gave me a present. Also, I had an opportunity to make a commemorative speech in front of workers, as poor as my English was.

By now, Kinki Sharyo has manufactured a total of 120 vehicle units for Boston, which have been serving local citizens as their means of transportation over 20 years.

### Dallas Project (from 1993) for DART

Equipped with its experience in Boston, Kinki Sharyo tackled this second project in the U.S. that we were awarded. Unlike the Boston project, the Dallas project involved constructing a new line consisting of a streetcar line in the downtown; and a track in the suburbs on which trains ran at a speed of 106 kilometers per hour. This kind of traffic system is referred to as LRT.



Raytheon, a U.S. firm, took charge of on-site assembly. Also, most interior works were performed on the site. There were no workers specialized in such works in the U.S.; even in Japan, it is difficult to secure a sufficient number of experts in vehicle interior works. Therefore, we had to overcome considerable difficulties to perform interior assembly works, which required adjustments according to body design accuracy.

Before starting this project, I assumed that the climate of a southern U.S. state was warm. However, I was surprised to find that there, temperature changed dramatically in the course of a day, especially in winter. When the temperature threatened to drop sharply in the daytime, local workers stopped work abruptly and went home as fast as they could. Asked about the reason for their early leave, workers replied that they had to rush home for fear that roads would become frozen and unnegotiable for their cars.

Our joint efforts to overcome hardships eventually made the project a great success that attracted attention from all over the U.S.

As a groundbreaking project, it has contributed to securing our company an important position in the LRV market of the country, with a succession of LRT projects being promoted there.

Currently, a total of 115 vehicle units are serving commuters and tourists in Dallas. We are now manufacturing the same number of low-floor T vehicles, to be inserted between two boxes constituting a cab unit.

### Hong Kong Project for KCRC



Kinki Sharyo delivered 40 passenger vehicles to Hong Kong in 1974. In 1997, as a major project marking the return of Hong Kong to China, we delivered 12 double-decker passenger trains adapted to a speed of 160 kilometers per hour, for the line linking Hong Kong directly with mainland China. Since the train formation was changed after the delivery of these vehicles, it became necessary to reconstruct half of lower-deck compartments to freight rooms. For that purpose, more than 10 workers from Kinki Sharyo and its cooperating company went to Hong Kong to attend to the work. It was at the height of summer, and the compartments with fixed windows and without air conditioners were as hot as in a steam bath. In that oppressive heat, everyone's working clothes became so wet that wringing them would have caused a downpour of sweat.

Subsequently, we delivered a total of 252 vehicles from 2001, including ones for a new line. We were involved in this project from the stage of the production of a mock-up. Due to a design change, it became necessary to reconstruct the mock-up on the site. We managed to perform this rush work thanks to the cooperation of local workers. Eventually, the mock-up was exhibited at a railway exposition named Expo Rail.

We completed the project smoothly by delivering all ordered vehicles. Maintenance and some additional works after delivery were also performed with the cooperation of local workers. Engineers hired in Hong Kong were industrious, and worked hard to mediate between Kinki Sharyo's team and the authorities, as well as to deal with complaints.

Later, some people who worked with us in Hong Kong came to Japan to see us. That was the moment when I felt that they were our real co-workers, with whom we had transcended differences in nationality to accomplish one good work.

Currently, we are manufacturing 34 additional vehicles for an extension line. As in the previous project for the Ma On Shan Rail, the current project involves the on-site assembly of some vehicles for the purpose of cost reduction. Also, the attachment of outer plate sheets has been newly included in the scope of on-site assembly, in addition to the installation of skirts, lower protective covers for side sliding doors and various signs. These works have been performed under Kinki Sharyo's technical guidance. This kind of practice is referred to as PA (from "Partial"), to distinguish it from FA (i.e. the American-style final assembly).

Projects in Hong Kong have come to involve the full-scale manufacture of parts in China. This shift of our production base has contributed to cost reduction not only in export projects, but also in the procurement of vehicle parts for domestic use.

As has been described above, Kinki Sharyo's experience has grown with the number of overseas projects awarded to it. Our company has thus developed a very international character, with a considerable number of first-line workers having made some overseas business trips. These experiences mean a great asset that will drive the future development of Kinki Sharyo.

Finally, one cannot discuss the character of a people in definitive terms, as there are individual differences. Still, a certain worker made an interesting remark to me that while it was all right with him to come to work early, he wanted to go home as early as possible after work to attend to family affairs. I feel that this kind of remark points to differences between Japan and the other countries regarding prevalent worker sentiments.

At all times – and on this very day when I am writing this chapter, some members of our company are working in some distant corners of the world, with such lessons as "When in Rome, do as Romans do" enshrined in their suitcase.