THE CURRENT SITUATION OF UNIT PRICES, ETC. IN SUBCONTRACTS OF REBAR WORK: A HISTORY BASED CASE STUDY OF A REBAR COMPANY

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Background & Object

- One of the major factors that affect the Japanese construction production system is the multi-layering of subcontractors. It has been pointed out frequently that business transactions in such multilayered systems often lead to pricing and scheduling difficulties due to the nature of the relationship between contractors and subcontractors.
- However, such circumstances have seldom been examined quantitatively. Therefore, it has been difficult to study them objectively and to improve the system.
- Nonetheless, we were able to obtain a set of relevant data, which we closely studied and analyzed to examine such transactions. The company that we examined, which we call Company A, is a rather large rebar company located near Tokyo.
- We statistically analyzed the firm’s 650 contracts over the past decade and discovered useful facts.

Data for the Analysis

- In the fall of 2007, we obtained the contract history of one rebar company.

Table 1: Profile of Company A

<table>
<thead>
<tr>
<th>Location</th>
<th>Headquarters in Tokyo; Processing plants in 2 locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation</td>
<td>1975 (Approximately)</td>
</tr>
<tr>
<td>Capital</td>
<td>50 million yen</td>
</tr>
<tr>
<td>Specialization</td>
<td>Rebar work ( Permit granted by the Governor of Tokyo)</td>
</tr>
<tr>
<td>Employees</td>
<td>160 (30 in processing plants, 100 on-site, 30 in other locations); 30 second-tier subcontractors (all numbers are approximate)</td>
</tr>
<tr>
<td>Work description</td>
<td>Its principal client is one large general contractor. Its work consists primarily in building construction.</td>
</tr>
</tbody>
</table>

1. Data: **650 contracts** (some small jobs were omitted)
2. Duration: **1997 - 2006** (ten fiscal years)

Table 2: Description of the Data in Company A’s Contract History

<table>
<thead>
<tr>
<th>Year</th>
<th>Client</th>
<th>Project</th>
<th>Project Price</th>
<th>Quantity</th>
<th>された</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Company name</td>
<td>Building name</td>
<td>Price given in ten thousands of yen</td>
<td>CONS</td>
<td>Month/year</td>
<td>Month/year</td>
</tr>
</tbody>
</table>

Fig. Kensetsu-Bukka
**Company A’s Contract History**

<table>
<thead>
<tr>
<th>年度</th>
<th>合計</th>
<th>建造</th>
<th>建築工事</th>
<th>建築その他</th>
<th>総合ゼンターサメント</th>
<th>鉄筋工事</th>
<th>合計</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>336</td>
<td>586</td>
<td>980</td>
<td>1,800</td>
<td>1,500</td>
<td>980</td>
<td>5,388</td>
</tr>
<tr>
<td>2011</td>
<td>324</td>
<td>524</td>
<td>960</td>
<td>1,880</td>
<td>1,560</td>
<td>960</td>
<td>5,128</td>
</tr>
<tr>
<td>2012</td>
<td>312</td>
<td>512</td>
<td>940</td>
<td>1,840</td>
<td>1,520</td>
<td>940</td>
<td>5,008</td>
</tr>
<tr>
<td>2013</td>
<td>300</td>
<td>490</td>
<td>920</td>
<td>1,820</td>
<td>1,480</td>
<td>920</td>
<td>4,880</td>
</tr>
<tr>
<td>2014</td>
<td>288</td>
<td>478</td>
<td>900</td>
<td>1,780</td>
<td>1,440</td>
<td>900</td>
<td>4,760</td>
</tr>
</tbody>
</table>

**Work Performance**

- The rebar used in each contract is estimated to range between 50 and 200 tons, according to a journal on construction related pricing information (e.g., Kensetsu-Bukka).
- However, Company A’s Median 300 tons in their contracts. (This may be due to the fact that Company A is a favored subcontractor of a nation-wide large general contractor.)

**Analysis of Clients**

- 26 customer firms
- GC17 is the main general contractor

**Quantity & Unit Price**

- Unit prices in big contracts (more than 60 tons) become more or less fixed around 50,000 yen/ton, and thus no economy of scale is observed.

**Fig. 1:** Fluctuations in Company A

**Fig. 2:** Per-Contract Quantity and Price

**Fig. 4:** Degree of exclusivity with GC17

**Fig. 5:** Quantity Contracted and Unit Price (including only ordinary projects)
Unit Prices Over Time
• Starting in the latter half of the 1990's, the unit price of rebar declined, but it rebounded in 2006.

Figure 7: Quarterly Fluctuations in Unit Prices in Contracts with GC17 (Box plot)

Rodman Shortages
• The rebound occurs following the shortage of rodmen in the Tokyo area (Kanto Region) in 2006.

Figure 8: Fluctuations in Rodman Shortages (by National Average and Region)

Rate of surplus and shortage of Rodman is the hugest (a reference)
• An analysis of work durations revealed little change in Company A's monthly number of finished projects (Fig.9-2), when compared with the number of projects begun (Fig.9-1).
• Operational resources are being effectively utilized.

Figure. Transition of the rate (%) of surplus and shortage of construction skilled laborer by occupation & district (Apr.,2005 - Feb., 2013) Source: MLIT, JAPAN

Seasonality of Quantity
• Fig. 9-1: quantity of new contracts   Fig. 9-2: quantity of executed work
Work Duration

- While the duration of a job tends to increase with the cost and scale of the contract, this relationship is not precisely proportional. Actual durations vary greatly from case to case.

Fig. 11: Relationships between the Work Duration and the Quantity Contracted

Conclusion

- Its analyses resulted in some interesting findings as described, but the scope of the results of this study is somewhat limited.
- The data used in this study has both strengths and limitations. Because the contract history that was analyzed in this study comes from a single rebar company.
- Nevertheless, this study provides a glimpse of the current situation in the rebar work sector in Japan and provides information that is virtually unknown outside the construction industry.
- We therefore believe that our results are valuable.