action is appropriate if only one defective unit is found in the first 20 units inspected? What action is appropriate if five defective units are found in the first 20 units inspected?

11. A company is using the Dodge-Romig Single-Sampling Plans for AOQL = 3.0 percent to inspect an incoming lot of material containing 350 units. Based on past experience, the average proportion defective for this supplier's process is 0.10 percent. Using Figure 11.19 in the text, how many units from the lot should be inspected? What disposition of the lot should be made if two units in the sample are found to be defective?

12. A company is using the Dodge-Romig Single-Sampling Plans for LTPD = 1.0 percent to inspect an incoming lot of material containing 350 units. Based on past experience, the average proportion defective for this supplier's process is 0.10 percent. Using Figure 11.20 in the text, how many units from the lot should be inspected? What disposition of the lot should be made if one unit in the sample is found to be defective?

13. A company is using General Inspection Level II of ANSI/ASQ Z1.9 to inspect an incoming lot of material. What sample size code letter should they use for a lot containing 300 units?

CASE STUDY 11.1: *The Turkell Stud Mill*

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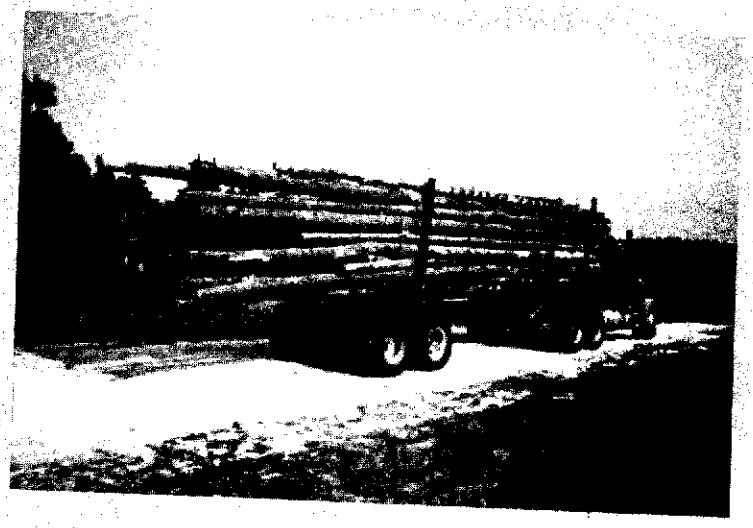
The Turkell Stud Mill is part of an international wood products corporation headquartered in the United States. The Turkell Mill produces dimensional lumber used in the construction industry. Your quality consulting firm has been engaged to assist Turkell in improving their incoming log inspection process. The general manager estimates that the mill incurs losses in excess of $100,000 per year due to overpayment for logs.

Turkell purchases its logs primarily from independent loggers. These loggers transport logs they cut to Turkell on trucks which contain from 20 to 50 logs. Because all of Turkell's products have a nominal length of 8 feet, they cut the logs into 8'9" blocks before milling. Logs whose length is not a multiple of 8"9" contain unusable wood that must be chipped and sold to one of the company's paper mills. The value of the chips is a small fraction of the value of the studs produced from useable lengths.

The problem is that the company has found that it is not feasible to inspect every log as received. Incoming logs may contain up to four blocks (35'). Trucks may contain up to 50 logs. With the current inspection procedure, only the logs on the outside of the shipment (face logs) can be accurately measured for length. The only way to accurately measure the length of all logs in a shipment is to "spread them"—that is, to unload the truck in the inspection area. This process is expensive and too time consuming to be feasible.



Currently, when a truckload of logs arrives at the mill, all of the logs receive an end inspection for cracks, decay, and similar defects, and the end diameter is measured. Four outside (face) logs are measured for length using a tape measure. An adjustment is made for any of the four measured logs that is not a block multiple. A block shorter than 8'9" is value adjusted. If all of the four logs measured require adjustment, the load is spread and all the logs are measured. Using the lengths obtained from the sample of four logs, the end diameters, and a "taper factor," the number of board feet in the shipment is determined. The payment to the logger is determined from the number of board feet in the load.

Based upon information obtained from the six previous months' milling operation, it is believed that 4.23 percent of the incoming logs are shorter than block length. Incoming inspection records from the same period indicate that about 10 percent of the short blocks are found and the appropriate adjustment made. The value lost by failing to adjust for a short block is about $9.00. The mill purchases between 250,000 and 300,000 logs per year.

There are other lumber mills in the area to which the loggers can sell their logs. The Turkell Mill general manager is concerned that if the inspection time per load is significantly increased, or if a new inspection process is perceived by the loggers to be unfair, he will lose many of his suppliers to other mills. He has asked that you evaluate the situation and make recommendations for reducing their losses due to short blocks that are missed at incoming inspection.

EXERCISES AND ACTIVITIES

1. Last week your incoming quality inspector accepted a lot of 200 units of motor housings from Lexco Co. using ANSI/ASQ Z1.4, normal inspection, and an AQL of 1.5 percent. This morning the production manager came into