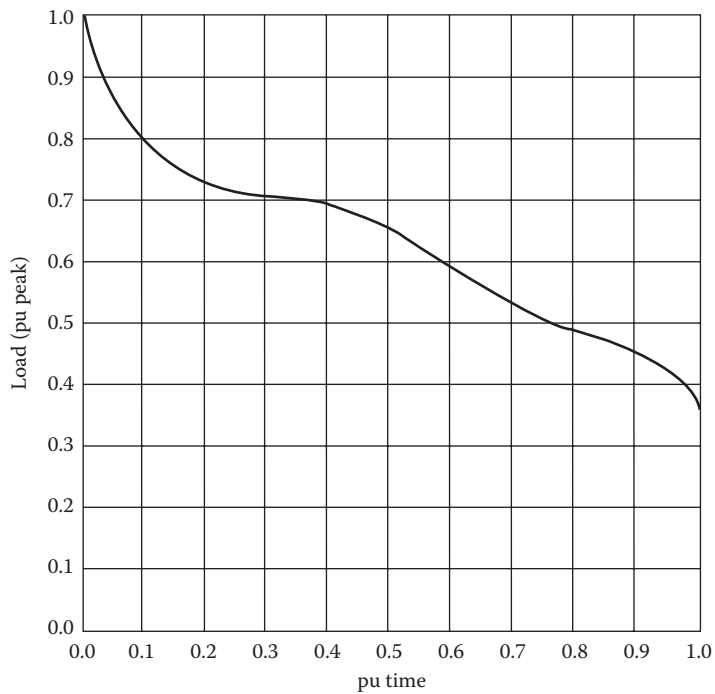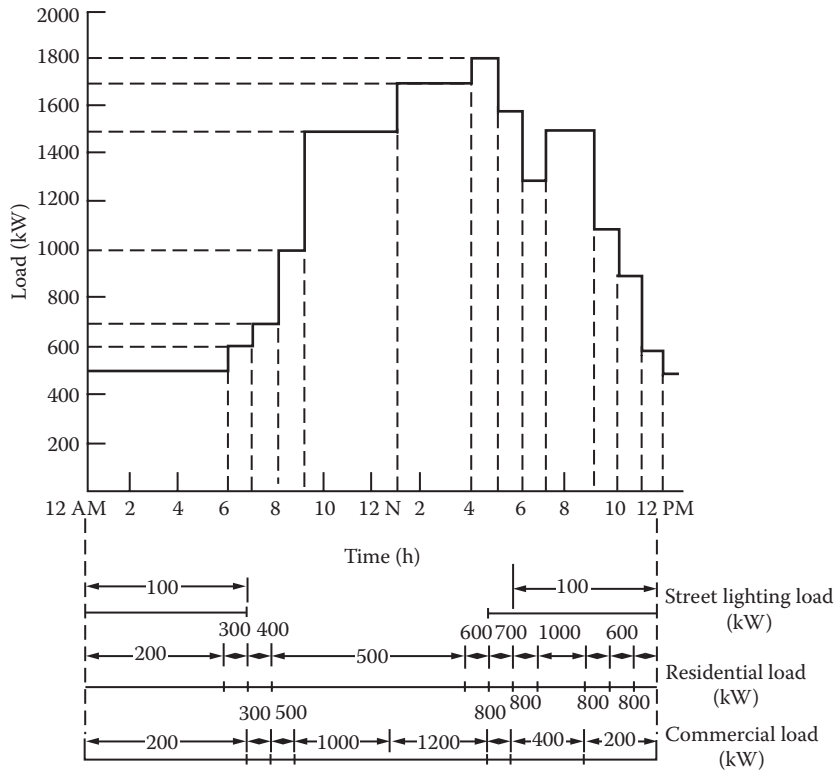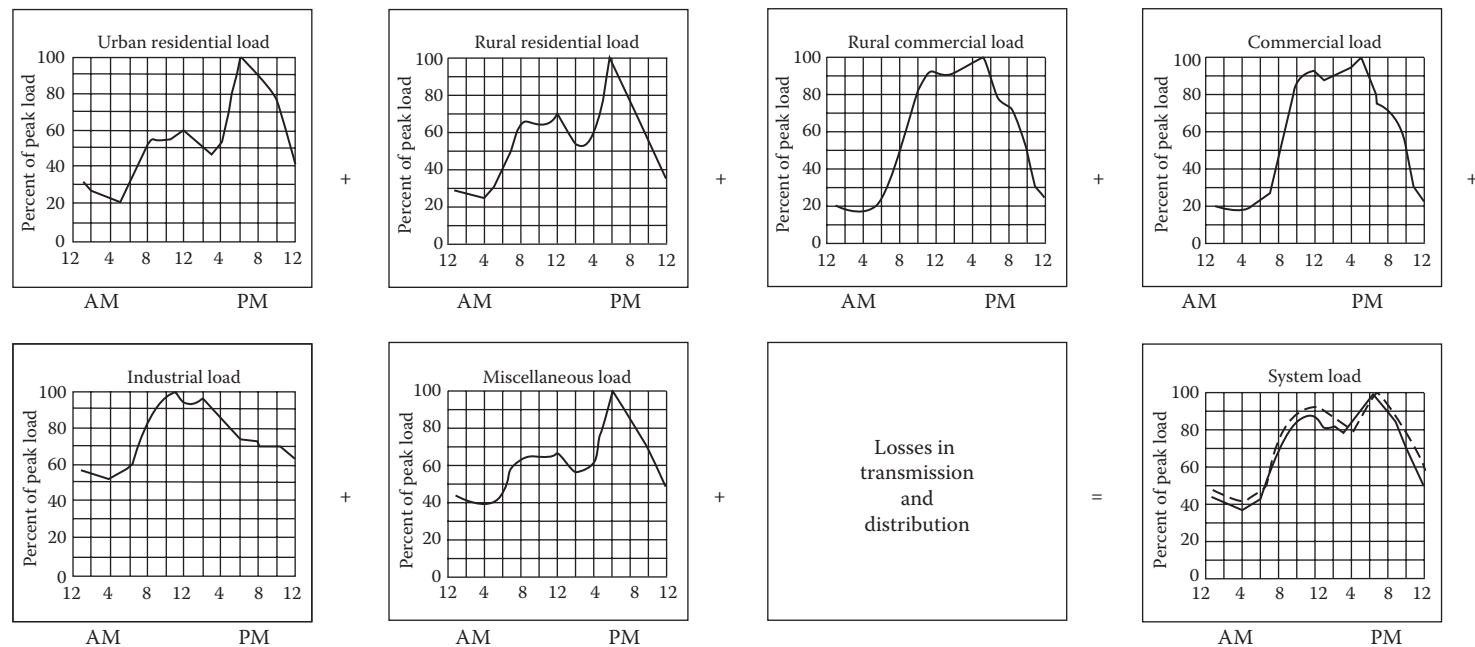**Figure 2.1** A daily demand variation curve.
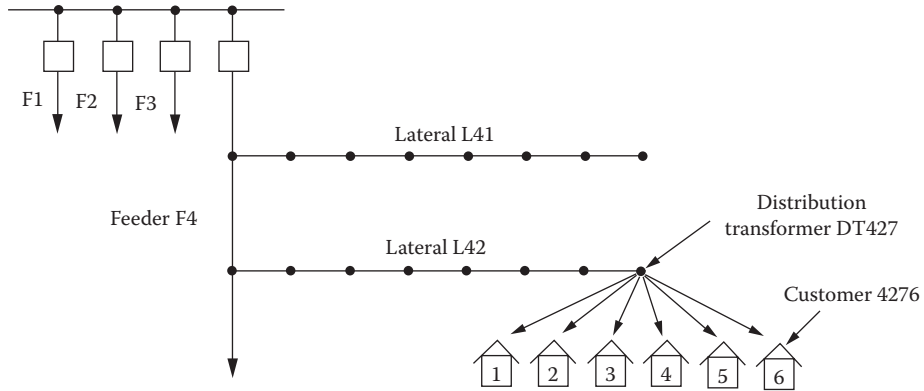
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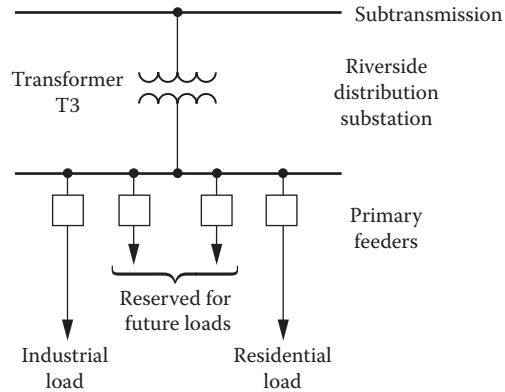
Figure 2.2 A load duration curve.

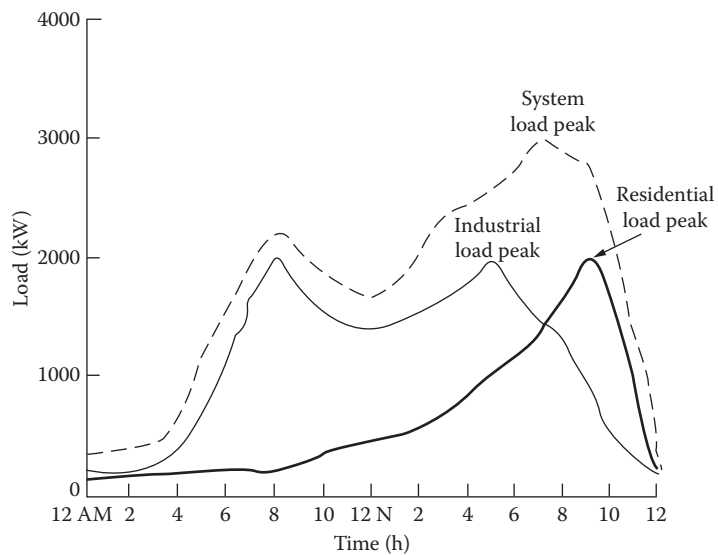**Figure 2.3** The daily load curve for Example 2.1.

Figure 2.4 Development of aggregate load curves for winter peak period. Miscellaneous load includes street lighting and sales to other agencies. Dashed curve shown on system load diagram is actual system generation sent out. Solid curve is based on group load study data. (From Sarikas, R.H. and Thacker, H.B., *AIEE Trans.*, 31(pt. III), 564, August 1957. Used by permission.)
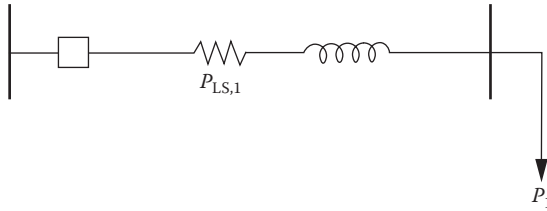
Figure 2.5 Illustration of load connected to a distribution transformer.

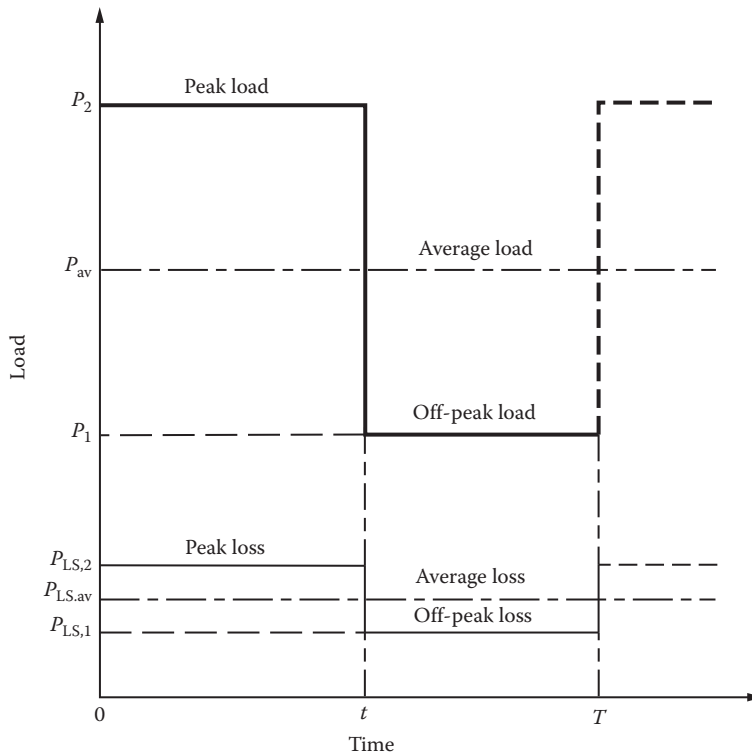**Figure 2.6** NL&NP's riverside distribution substation.

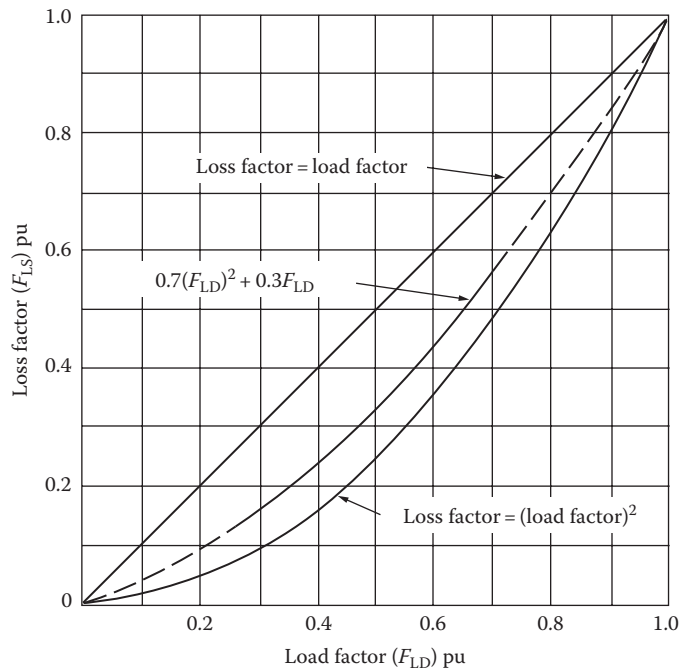**Figure 2.7** Daily load curves of a substation transformer.

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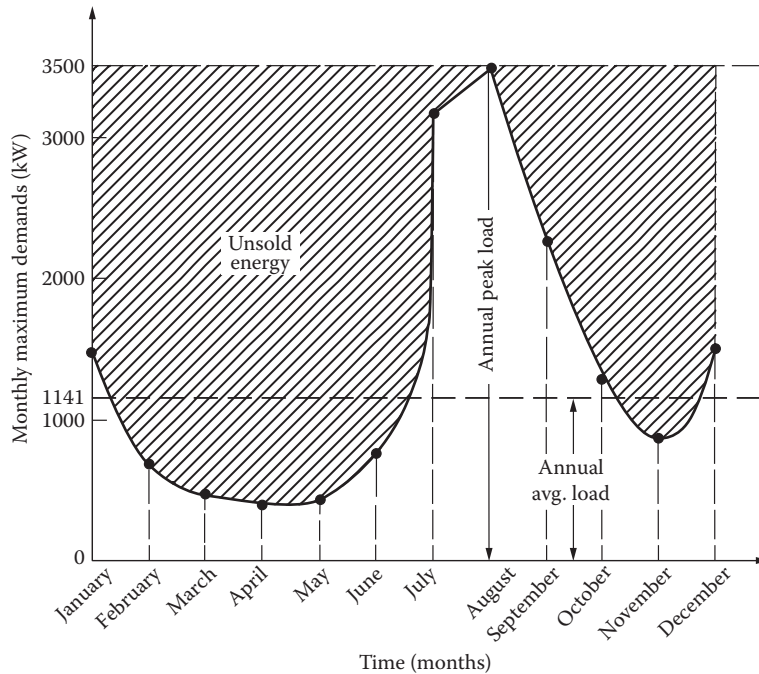**Figure 2.8** A feeder with a variable load.

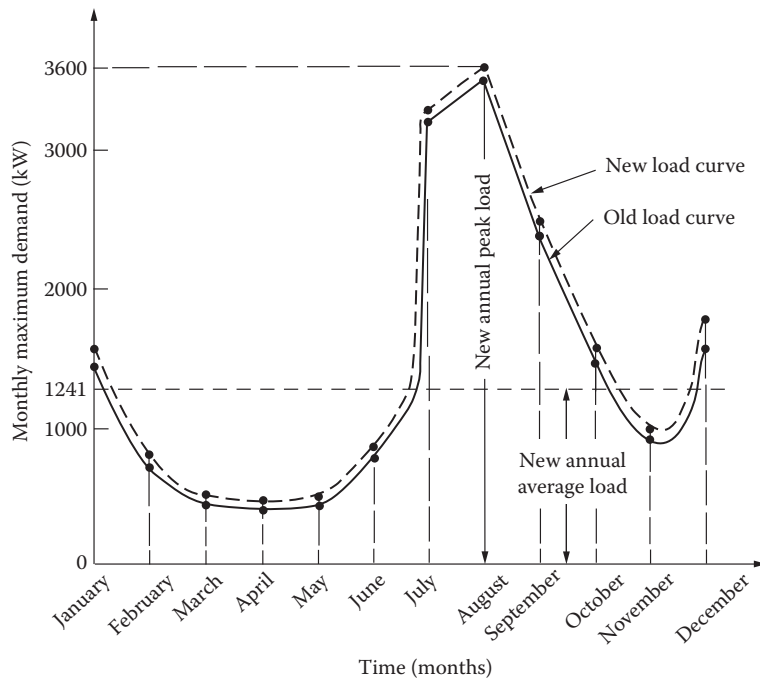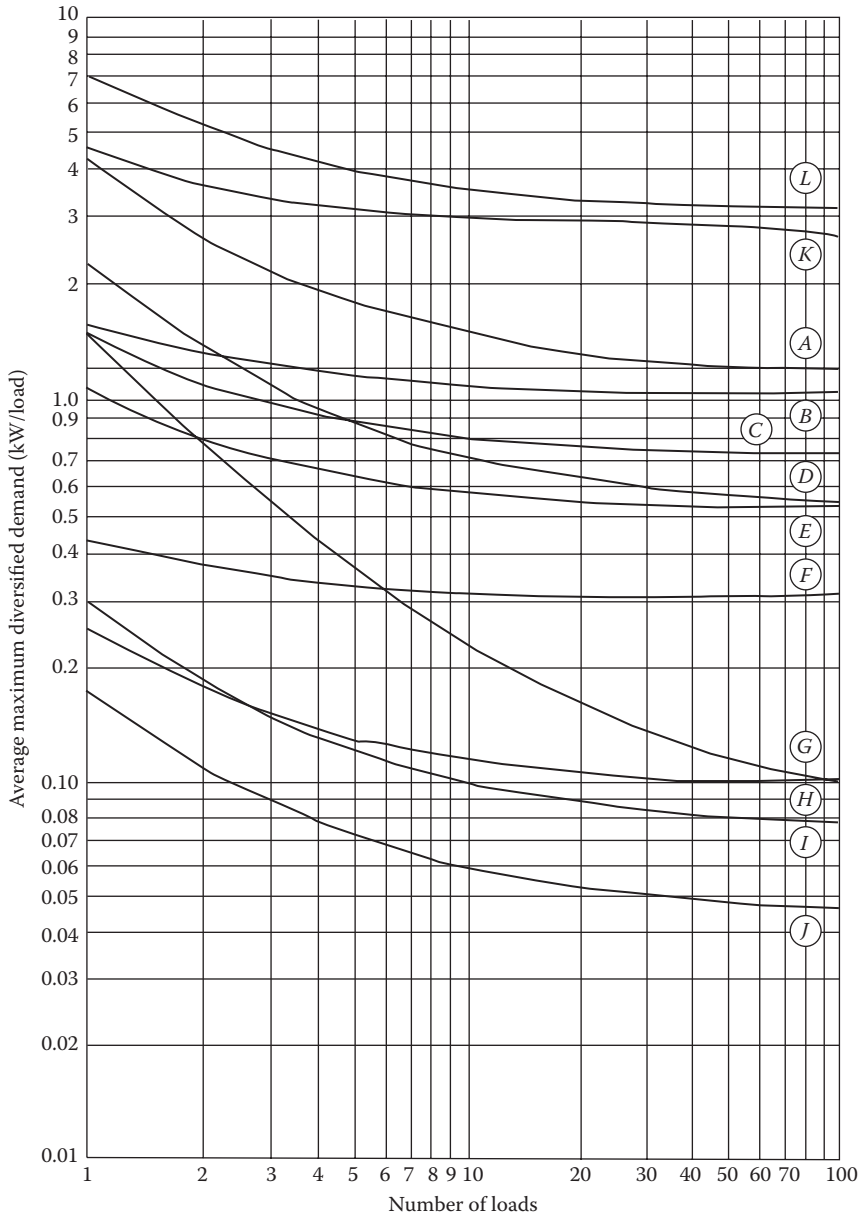**Figure 2.9** An arbitrary and ideal load curve.

Figure 2.10 Loss factor curves as a function of load factor. (From Westinghouse Electric Corporation, *Electric Utility Engineering Reference Book-Distribution Systems*, Vol. 3, Westinghouse Electric Corporation, East Pittsburgh, PA, 1965.)
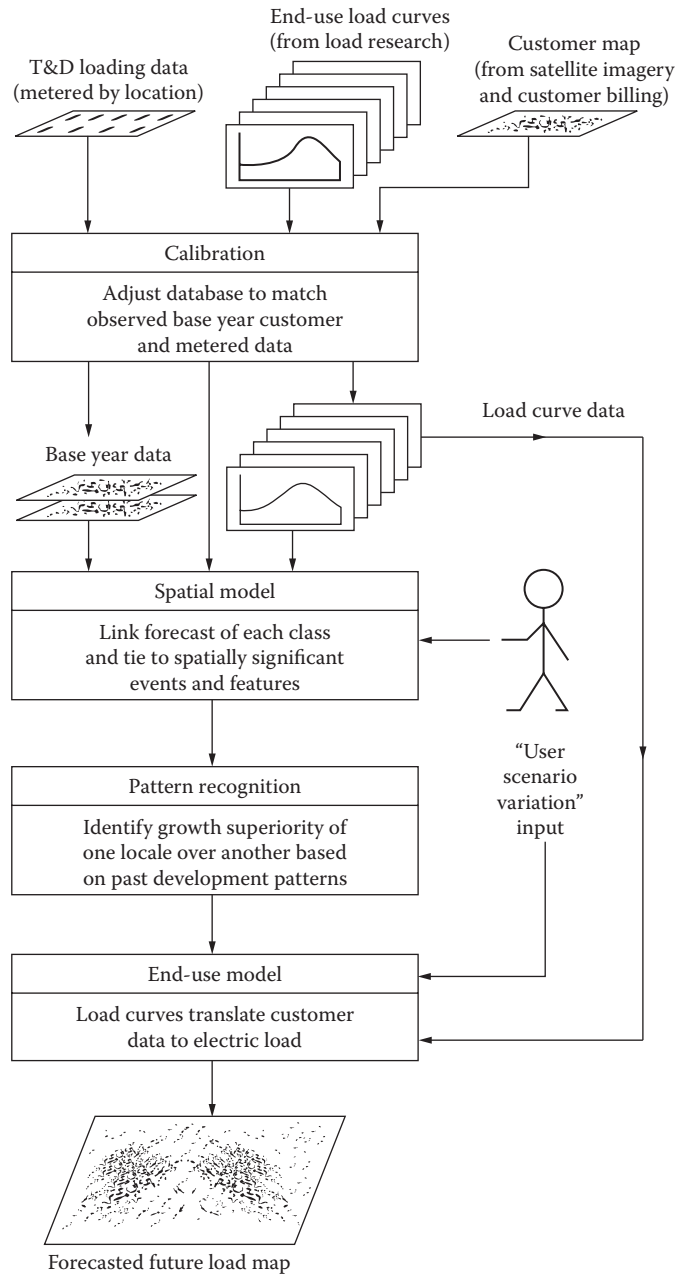
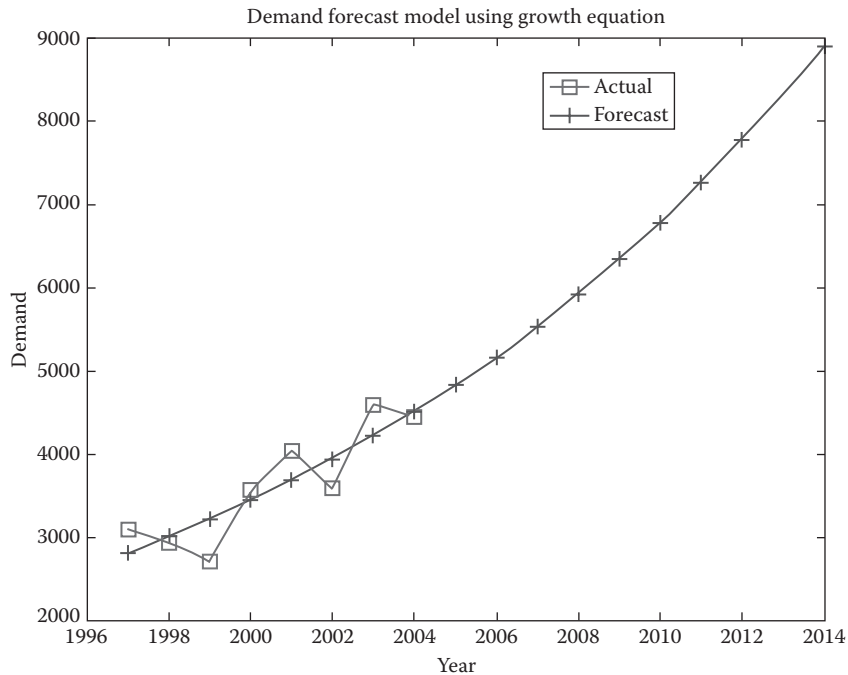**Figure 2.11** A monthly load curve.

Figure 2.12 The new load curve after the new load addition.

Figure 2.13 Maximum diversified 30 min demand characteristics of various residential loads: *A*, clothes dryer; *B*, off-peak water heater, "off-peak" load; *C*, water heater, uncontrolled, interlocked elements; *D*, range; *E*, lighting and miscellaneous appliances; *F*, 0.5-hp room coolers; *G*, off-peak water heater, "on-peak" load, upper element uncontrolled; *H*, oil burner; *I*, home freezer; *J*, refrigerator; *K*, central air-conditioning, including heat-pump cooling, 5-hp heat pump (4-ton air conditioner); *L*, house heating, including heat-pump-heating-connected load of 15 kW unit-type resistance heating or 5 hp heat pump. (From Westinghouse Electric Corporation, *Electric Utility Engineering Reference Book-Distribution Systems*, Vol. 3, Westinghouse Electric Corporation, East Pittsburgh, PA, 1965.)

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Figure 2.14 Spatial load forecasting. (From Willis, H.L., *Spatial Electric Load Forecasting*, Marcel Dekker, New York, 1996.)

Figure 2.15 The answers for the parts (a) and (b).

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Figure 2.16 A customer's monthly electric bill.

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Figure 2.17 Two customers connected to a primary line of the NL&NP.

30-min D_{max} = 22 kW/month
W_A = 7000 kWh/month
PF_A = 0.90 lag

30-min D_{max} = 39 kW/month
W_B = 7000 kWh/month
PF_B = 0.76 lag

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Figure 2.18 Single-phase electromechanical watthour meter. (From General Electric Company, *Manual of Watthour Meters*, Bulletin GET-1840C.)

Figure 2.19 Basic parts of a single-phase electromechanical watthour meter. (From General Electric Company, *Manual of Watthour Meters*, Bulletin GET-1840C.)

Figure 2.20 Diagram of a typical motor and magnetic retarding system for a single-phase electromechanical watthour meter. (From General Electric Company, *Manual of Watthour Meters*, Bulletin GET-1840C.)

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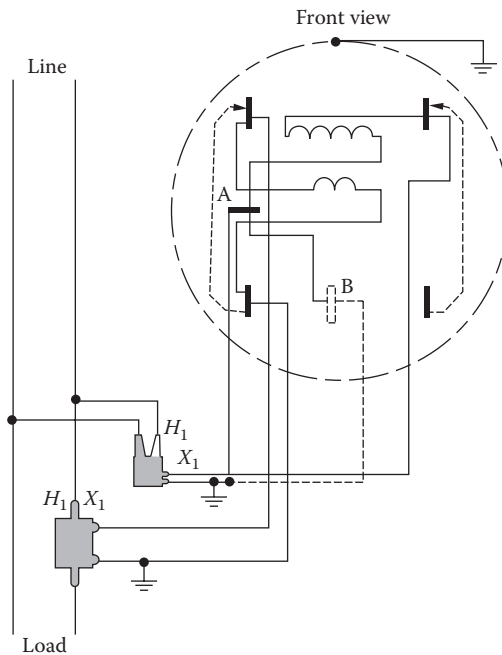
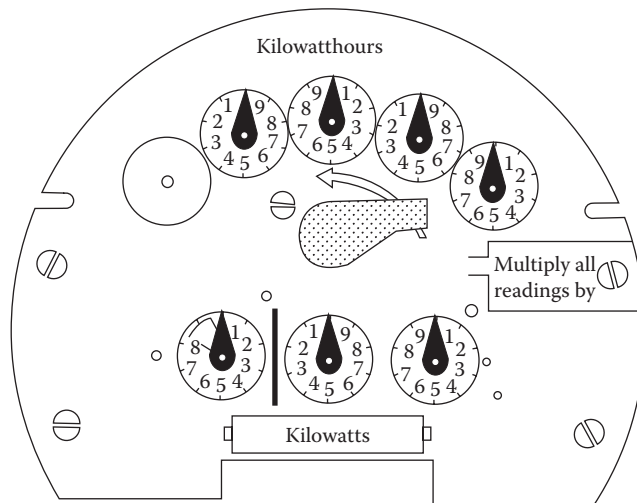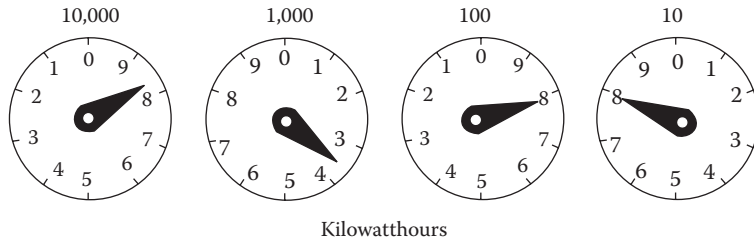(a)   (b)

Figure 2.21   Typical polyphase (electromechanical) watthour meters: (a) self-contained meter (socket-connected cyclometer type). (b) transformer-rated meter (bottom-connected pointer type). (From General Electric Company, *Manual of Watthour Meters*, Bulletin GET-1840C.)

Figure 2.22 Single-phase, two-wire electromechanical watthour meter connected to a high-voltage circuit through current and potential transformers. (From General Electric Company, *Manual of Watthour Meters*, Bulletin GET-1840C.)
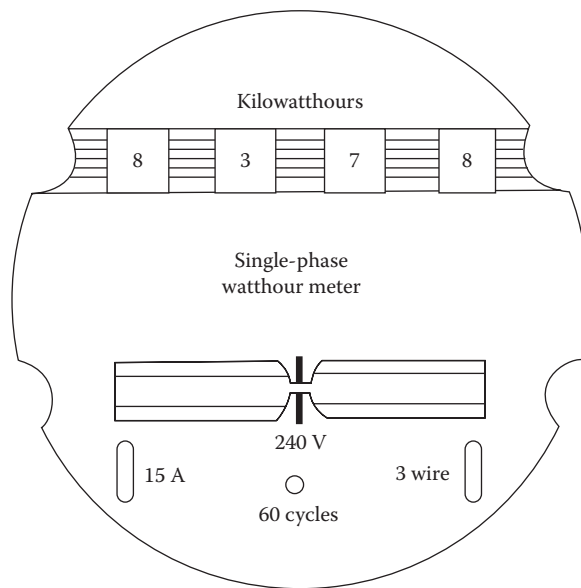
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Figure 2.23 The register of an electromechanical demand meter for large customers. (From General Electric Company, *Manual of Watthour Meters*, Bulletin GET-1840C.)

Figure 2.24 A conventional dial-type register of electromechanical meter.

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Figure 2.25   A cyclometer-type register.