A backlog management approach to reserve capacity for emergency demand: the case of service dispatching in power distribution utilities

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Abstract

The attendance of emergency services in electric utilities involves the well-known vehicle routing problem in its dynamic form. By knowing gradually these emergency requests in such a way that vehicles are following their pre-established routes, the question that arises from this context is how much time of the workday will be subtracted by addressing these emergency services. In addition, when considering pre-established routes in the context of a power distribution utility, there are several levels of importance related to the services previously routed.

Assuming the use of a vehicle routing algorithm with time windows and on site service to construct the pre-established routes, the appropriated management of the service backlog may reserve a certain amount of time on the workday in such a way that this amount is proportional to the number of hours to be used on the attendance of emergency services. Moreover, this reservation is timely dependent: when observing the past request information, one may note that the emergency demand is highly dependent of the day of the week and of time of the day.

This work focuses on the development of mathematical programming approach, based on mixed integer linear programming to rationing the backlog when reserving capacity for emergency demand, being this level determined by a forecasting method based on time series.

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