Ideal Warehouse (DC) Location ~ The Contouring Method

Summary

This describes one use of the zone of indifference method in choosing an ideal warehouse location. Zone of indifference uses contours to map the points at which transport costs increase by (say) 5% or 10% over the ideal distribution centre location. The method allows (indeed encourages!) a balance to be drawn between land (etc) and transport costs[1].

The example is real and some of the lessons are generic. In this case, the 5% zone - the area of land within which transport costs are within 5% of optimum - covers 6,000 sq km. This is a much larger area than provided by conventional methods, and opened up quite unexpected opportunities for choosing a location where labour and land availability was better than the usual M1 corridor.

The 10% zone covered the area of 5 average counties

The distribution need

A product is distributed to over 100 stockholding service points around the country. Some of the product is time critical - it must be possible to deliver to every outlet every night. The wide product range, over 10,000 SKU's with many very slow moving, demands that stock is kept at a single location. Regional DC's were considered, but ruled out because of stock duplication or 'stock in the wrong place' issues. Sales generally mirror the population, but with one interesting variation - the delivered cube per branch is nearly constant. A branch will get one roll cage per night, even if the cage is only a quarter full. This 'weights' the solution further north i.e. away from the population mass. Finally, the nature of the product and the very late order cut-off demands radial distribution.

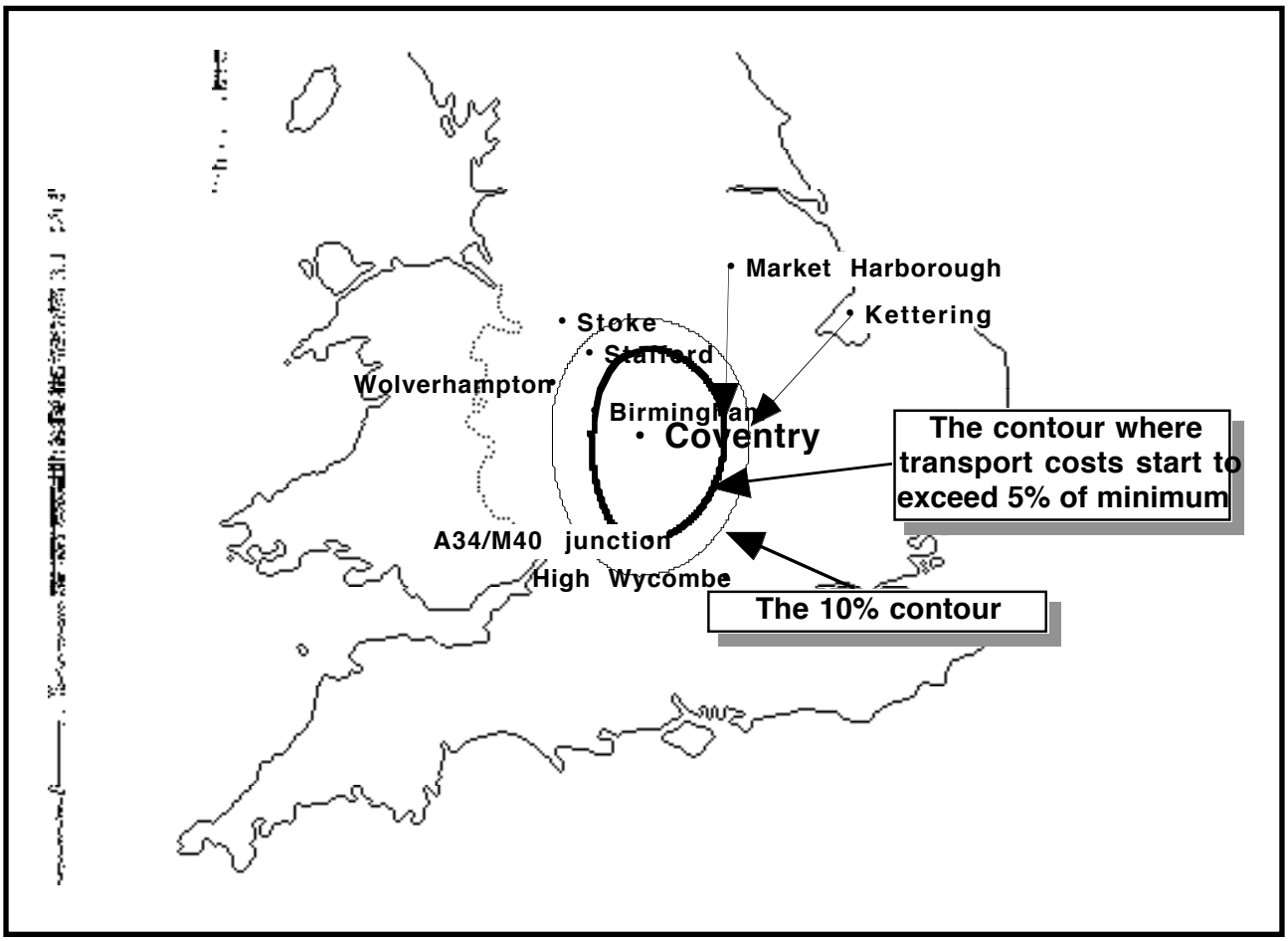
Developing the solution and the options

To minimise total mileage the optimum location was near Coventry. Since this is right in the high rent area so favoured by others, we wanted to look further afield. It was this which prompted 'contouring' - identifying all those points which lay along lines with 5% and 10% greater travel distances and costs than a Coventry hub.

The results were a shock. I've presented them as the large towns nearest the most N, S, E and W extremities of the contour just to aid visualisation. Of course the actual contour is not a rectangle, but a flattened oblong. It just misses some of the towns mentioned.

The 5% extremes stretched from Stafford in the North to the A34/M40 junction (just north of Oxford), and from Market Harborough (E) to Birmingham (W). The total area was about 6,000 sq km, or nearly 2.5 average sized counties. 5% extra on a transport bill of £1.5m a year is paid for by a £1/sq ft/ yr rent difference on a 75,000 sq ft DC. Most potential locations are within the contour rather than on it, so may carry only 1%, 2% or 3% transport cost penalties.

[1] See also Warehouse Location, a new approach.



The 10% extremes stretched from Stoke (N) to High Wycombe (S) and from Kettering (E) to Wolverhampton (W). This is an enormous area, almost 5 average sized counties. Put another way, it's doubtful if it is worthwhile uprooting a successful operation based in (say) Reading solely to attain transport savings.

Conclusion

Optimisation of warehouse location can provide too narrow a focus. It is then far too easy to sub-optimise the whole distribution function. Contouring is a powerful tool for opening up, while still controlling, a wider range of possibilities. The area enclosed by a contour (and its associated cost) will vary from case to case, but the area is often much larger (and the costs much lower) than we might think.

Authors Notes

Bill Brockbank is one of Europe's leading logistics innovators and consultants. His original article on warehouse location appeared in Distribution Magazine, and led to at least one of the major software packages (CAST/dpm) being updated to incorporate his ideas. He also developed and implemented the definitive tables for balancing inventory, service level, and lead time at different rates of sale.