

ISyE 4803
Advanced Supply Chain Logistics
Fall 2009

Reading Assignment 10

Due Date: November 17, 2009

Read the materials below in preparation for discussion in class. The questions are intended to guide your reading and thoughts, but are not the only aspects that will be discussed in class.

1. Hobeika, A.G., Kim, S., and Beckwith, R.E., “A Decision Support System for Developing Evacuation Plans around Nuclear Power Stations”, *Interfaces*, vol. 24, nr. 5, pp. 22–35, 1994.
 - (a) What type of disaster response does the article address? What other activities should form part of disaster management?
 - (b) List the important output that an evacuation decision support system should produce.
 - (c) Explain each of the five steps in the evacuation planning process.
 - (d) On page 31 it is written “...finding those values of α , T , and H that minimize the network clearance time.” Does the statement make sense? Explain.
 - (e) What is meant with an “exit point” on p.31?
 - (f) What input is needed for the evacuation planning process?
 - (g) What is the difference between macroscopic and microscopic traffic flow models?
 - (h) List some traffic management strategies that can be used to reduce evacuation times.
 - (i) On p.34 the following equation is given for the assignment probability $a(i, j)$ of arc (i, j) , that is, the probability that an evacuating motorist who is currently at node i next travels on arc (i, j) :

$$a(i, j) = e^{\theta[p(j) - p(i) - l(i, j)]}$$

if $p(i) < p(j)$ and $q(j) < q(i)$, and $a(i, j) = 0$ otherwise.

- i. Why is it assumed that $p(i) < p(j)$ and $q(j) < q(i)$ for the probability $a(i, j)$ to be positive? Does it make sense?
- ii. What is the sign of $p(j) - p(i) - l(i, j)$? Explain.
- iii. What is obviously wrong with the expression for the “probability” $a(i, j)$ on p.34? How would you modify the expression to correct the problem?
- iv. What else is a shortcoming (but not obviously “wrong”) of the expression for the “probability” $a(i, j)$ on p.34?