Exercise 1/1/D/C and 1/1/D/D

A chemical plant is located close to an industrial harbor where a tank is used to supply the plant with 12500 cube meters of gas per day. The gas costs 0.50 € per cube meter. The annual obsolescence rate is estimated to be 20%. Two projects are under evaluation to supply the tank.

Project 1.
Project 1 is based on the construction of a pipeline that could supply 30000 cube meters of gas per day. The pipeline could be opened and closed at regular time intervals and each cycle would cost 200 €.

Project 2.
In project 2 the tank would be filled by a small ship, with a 7 days *lead time*. Every travel would cost 2500 euro.

Since the construction of the pipeline would be very expensive, one wants to evaluate the savings in the inventory management costs that could be obtained with project 1 with respect to project 2. For each project one would like to compute the EOQ, the optimal period and the minimum capacity of the tank.

In project 1, the optimal replenishment period must also be computed.
In project 2, one would like to know the inventory level that should trigger a new order and the required capacity of the ship.

To reduce the cost of project 1 two proposals are made:
  a. Use an existing smaller tank whose capacity is 80000 cube meters.
  b. Use a cheaper technology for opening and closing the pipeline. Such a technology has the drawback of requiring that the replenishment period be at least 7 days long.

What would be the change in the inventory management costs in these two cases?