**LOGISTIC ORGANIZATION OF A BOTTLE TRANSPORT BUSSINES.**

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The present document undertakes the question of where situating the warehouses and production points of a business from the point of view of the transportation costs. From the analysis of a particular case with some specific data, two different methodologies will be established in order to situate the facilities mentioned above. Both methodologies will permit us to calculate the transportation costs, both of the actual operative and of the possible alternatives that we will propose.

First we will describe which is the actual operative employed to supply the present consumptions, so we can have a reference to compare with the obtained results.

The first methodology is based upon the Gravity Center concept. We will define a procedure to situate the different warehouses in the first place, then to locate the production points, and in finally to correct the warehouses' position based in the situation of these production points previously obtained. We will define a way to calculate the total transportation costs. In the conclusions we will discuss about the real utility of this first methodology to situate the warehouses and production points. The calculations in this chapter will be carried out in Excel, given its not excessive complexity.

The second methodology is based upon the study domain's simplification from a grafo. We will obtain the shortest paths to move across the grafo in the most efficient form. From a certain warehouses' number and bottling points we will try to obtain all the possibilities, that is, all the nodes combinations in which we can situate the warehouses and production points. At this point, we will find with the difficulty that the total number of resultant combinations takes us to an untreatable problem. Because of this reason we will need to establish a criterion in order to reduce the total number of combinations to study. By imposing the condition that the points that we take from the grafo keep a certain *separation* between them we will get to reduce significantly the number of combinations. For each combination we will establish to which warehouse each consumption belongs to, in order to operate in the most economic way, and we will calculate the prices of transportation of all them, keeping the combination requiring the smaller transportation costs. We will see how the results vary as the *separation* required between the chosen points is changed. We will find that an optimum value for this *separation* exists, with which we can obtain significant savings by verifying a reduced number of combinations in an reasonable calculation time.

At this point we will introduce a new freedom degree, being this the number of warehouses needed. We will see that depending on the number of points used the optimum *separation* value varies. We will work in this point until an adequate relation between these two factors is characterized. We will obtain for each case, characterized by the number of warehouses and production points employed, an optimum combination, and some specific transportation costs. The whole work and calculations for this second methodology are based on several Fortran programs.

We will analyze the sensibility of the transportation costs to the number of warehouses used. We will see how as the number of warehouses used rises, the transportation costs fall while the savings increase (or prices reduction) is slower. We will obtain a very interesting conclusion based in this idea.

We will also study which are the nodes that appear more frequently in the optimum combinations for the different cases. We will see that some of them are often repeated following a certain pattern.

With the conclusions obtained, especially from the second methodology, we think that we can establish a good start point for the study of similar cases, and very useful to reduce the costs by choosing the number and situation of the production and distribution points.