PT Semen Gresik (Persero), Tbk as one of the biggest portland cement company in Indonesia needs particular strategy for existence of the company. One of the strategy for that aim is carrying out a good inventory management. In the company, an effective planning and control system must produce a balance between two things, there are: take care the company from lack of inventory, and in the other side inventory cost must in the minimum level. To gain that balance, there are many factors that we must pay attention, especially for anything about inventory. Because many factors are playing a role in this problem, so we can not only pay attention for one or more factors involved, but we must look whole of the problem. Many factors made this problem became non linear. So if we use old method, it was so difficult and needed a lot of times. Because of that, so in this examination we use Artificial Neural Network method. We use it because this method can learn from past (sample), generalize that sample and make a characteristic abstraction for essential input although it is not contain relevan data. This examination yields a neural model that can initialize input-output pattern(s) from the buffer warehouse problem with desired error level. The best model use desired error level 0,0001 and momentum 0,7. Beside that, sensitivity test also performed to find sensitive input variables. Three sensitive variables were found, there are: average stock/day, warehouse capacity and cost per bag.

Keywords : Artificial Neural Network, training, testing, sensitivity analysis