I.   INTRODUCTION

A. Background to The Research

The development of technology and information at this century 21 increased very rapidly. Evidenced by the many discoveries found in the fields of science, health, astronomy, education and even in the construction that very helpful the Engineer for making or facilitate projects. So many approaches were carried out by the researchers. In 90' there were quite a lot of analysis designing geotechnical project were based on analysis of the deterministic models. Although the approach in deterministic method has been carried out extensively, in fact almost all soil properties varies and the possibility of homogeneous extremely rare (Listyawan, 2006). So the concept of probability analysis is better solutions to handle the less precision of deterministic methods.

The deterministic way uses only one value of certain soil properties which considered representative, the concept of probability of soil properties uses all the data existing to accommodate any variant that occurs. One of the soil properties that show high variation in the data are the results of cone penetration test (CPT), which in Indonesian is better known as 'sondir'. The high variation of data can be seen in the value of tip resistance (q_c) and sleeve friction (f_s) from the CPT. Processing data to be used in the analysis of probability models then used for raft foundation stability analysis.

Hotel Anugerah Palace is built on area of 1100m^2, consists of 9 floors and 1 Basement. The projects is scheduled to finish in June 2013. Due to the construction of this hotel is located in the city center acces is very easy to get there, let alone the town solo is a destination city for trade. Besides, the position of the town as a solo 3-way intersection of the east of the area east of Java, north of the area and the coast road west of the city of Yogyakarta. Not only as a trade center, a solo also serves as a transit town to the big cities so that means no lodging to be a highly promising.

In first design the Hotel Anugerah Palace will construct using bore pile foundation, but after testing using sondir the value of good soil is too far, so bore

pile foundation method cannot be applied for this construction. Consolidation in soil also in different descent which different area, if using bore pile foundation that make building consolidate with different velocity. Then to avoid it, choosing other method for foundation that is raft foundation. Because raft foundation is constructed like a mat that cover all area of building, not only around of column.

In previous research, Murdhiyanto (2012) represent the manually calculation (fellinius method) and the Crystal Ball program analysis, the value of the safety factor the most variation happened to the field of landslides III that is 1.2885(for manual) and the percentage of the value of $F > 1$ for 87.770% (Crystal Ball). Variations performed on Fellinius method allows the slope will be stable or not eroding as more security value of 1. While the results of the program Crystal Ball can be concluded that the slope it probably persist against eroding $> 80\%$.

The method used in previous research using the slope media as research material, but for raft foundation no one has done research.

B. Statement of The Research

Based on the problems that have been described on the background, can be taken a formula as a reference. The statement of the research as below:

1. Need to conduct a research for the stability of raft foundation on areas that have a high building.
2. Finding the value of safety factors for raft foundation using various CPT data to obtain the smallest value of the safety.

C. The Research Objectives

The research objectives of this research are as below:

1. To determine the probability function that represents the data sondir.
2. Design a raft foundation using statistics methods that treat earlier using MATLAB to obtain statistics data for analyzing raft foundation.
3. Design dimension, depth, and safety factor of raft foundation.

D. Benefit of The Research

      The expected benefits of this research are as below:

1. To find out more in the raft foundation stability analysis for high buildings.
2. Integrate completion of the design of raft foundation stability use statistics and probability.
3. To know and to apply geotechnical software in the field that are MATLAB and Crystal Ball to resolve raft foundation stability analysis.
4. The result can be used as input and consideration to similar research for the next.

E. Limitation of The Research

      Order to this research will be focused on the problem, it is necessary to add any boundaries. The boundaries problem as below:

1. Sondir Data is obtained from CPT test in construction of the Hotel Anugerah Palace, Surakarta.
2. Stability method of raft foundation is used on the project buildings.
3. The type of raft foundation that used is flat plate.
4. The method of raft foundation that used is rigid conventional method.

F. The Originality of The Research

      Final project research earlier has been done on the theory of probability, such as:

1. Pipit Dwi Prakosa, Universitas Muhammadiyah Surakarta (2011) studied of Analisys Pile Foundation with Principlies of Probability.
2. Slamet Murdhiyanto, Universitas Muhammadiyah Surakarta (2012), studied of Analysis Stability of Slope Fellinius Method with Variety Landslides Area Depend On Probability Theory.
3. Dimas Roman Widyaprakarsa, Universitas Muhammadiyah Surakarta (2012), studied of Analysis Stability of Slope at Saturated Clay with Variety Landslide Depend On Probability Theory.

Design of Raft Foundation Based on Probability Analysis in constructions Anugerah Palace Hotel Surakarta has not been studied previously in the scope of Muhammadiyah University of Surakarta.