Chapter 4

4.1 General:-

The questionnaire was to indicate the factors causing delay, indicating the 6 key factors and other branches, as well expected types of delays that happen due to any other factor, the questionnaire was distributed to contractors, consultants and the owner via Internet and job interviews and taws collected in the same way.

This section dealt with the analysis of the gathered information (Appendix A) from the questionnaire survey and included identification of the critical causes of delays, responsibilities and types of delays, based on the delays checklist outlined in the questionnaire.

And the research discussed the main reasons for the delay, responsibilities and the possibility of occurrence and type of delay, as stated in the questionnaire in tables and charts dealing with every reason.

4.2 Section A:-

This section provided general information about the participation of respondents to the survey. The aim of this section was to give an image of the strength of respondents‘ experience, and therefore to indicate the degree of reliability of the data provided by them.

4.2.1 Type of business:-

Figure 4.2 bellow shows the Type of business of participants; consultant 46%, contractor 34% and clients 20% of the projects.

4.2.2 Sector type:-

Figure 4.2 bellow shows the sector type participants work in and it was found that most of participants work in both private and public projects.

4.2.3 Project sizes:-

Figure 4.3 bellow shows is the sector type of building and it was founded that most of participants work in large projects.

4.2.4 Respondents’ experience:-

Fortunately, most of the professionals who participated in this survey have

Experience of 5-10 years, which in turn raises the reliability of the data collected from the shared knowledge of long years of experience in the building construction field show figure 4.4.

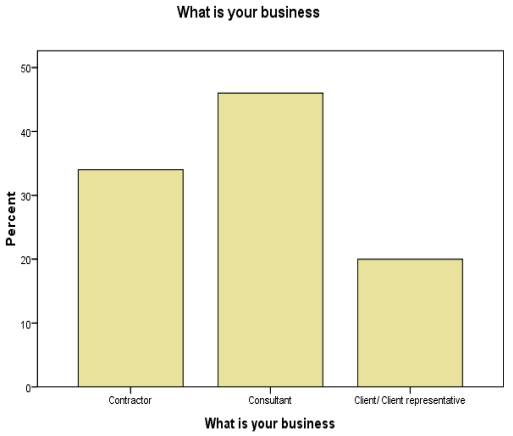
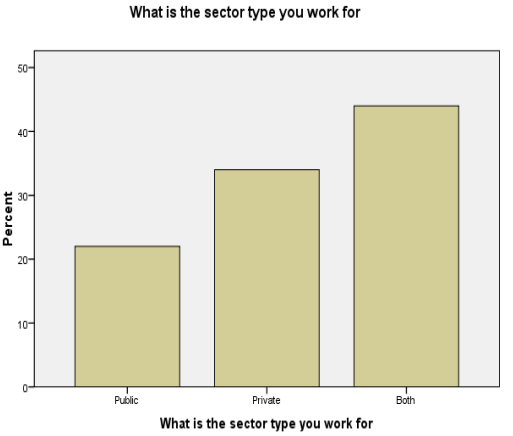


Figure 4.1 bellow shows the is the Type of business participants



Figur 4.2 types of business participants

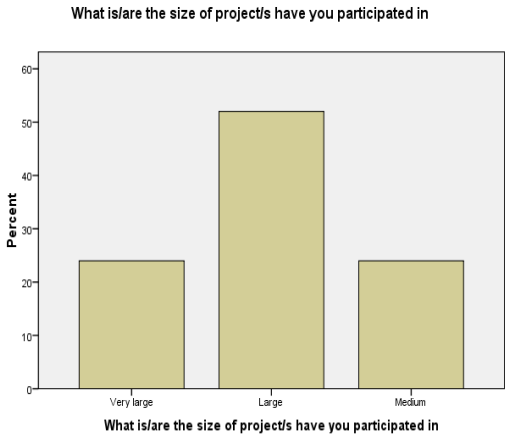


Figure4.3 Project sizes of working participants

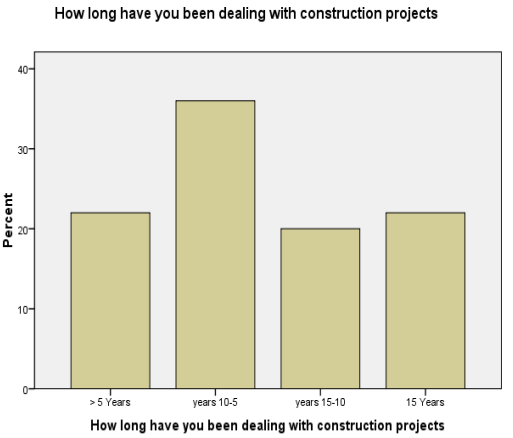


Figure 4.4 The experience of working participants

4.3 Section B:

This section deals with the analysis of the information gathered (Appendix B) from the questionnaire survey and includes the identification of the critical causes of delays, responsibilities and types of delays based on the delays checklist outlined in the methodology section of the report.

Identification of the key delays:

display of the main reasons for the delay in figure 4.5 to 4.154. Each Figure is classified one of the reasons for the delay and explains who is responsible for it, and the chance of occurrence and type of delay that will happen, according to the perspective of the participants in questionnaire and founded as follows:

4.3.1Financial related :

4.3.1.1 Difficulties in financing project:

Figure 4.5 below shows the result of analysis of who is responsible of this reasons of delays .The contractor has received the highest percentage of responsibility 60%, followed by the government 18%, followed by shared 12%, followed by contractor 6% then consultant 4%.

And figure 4.6 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes has received the highest percentage 66%, followed by the always 34%, then rarely 0% .

Also figure 4.7 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 42%, followed by excusable-non-compensable 32%, followed by excusable-compensable 24%, then concurrent 2%.

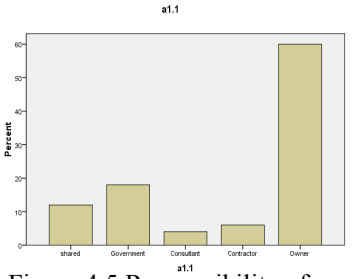


Figure 4.5 Responsibility of financial related– difficulties in financing project

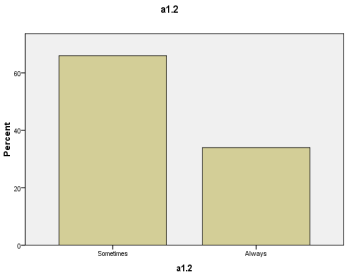


Figure 4.6 Chance of occurrence of financial related– difficulties in financing project

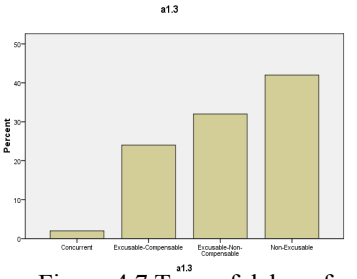


Figure 4.7 Type of delay of financial related– difficulties in financing project

4.3.1.2 Economic problems:

Figure 4.8 below shows the result of analysis of who is responsible of this reasons of delay . The government has received the highest percentage of 64%, followed by the shared 20%, followed by contractor 12%, followed by consultant 2% then owner 2% .

And Figure 4.9 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 50%, followed by the always 36%, then rarely 14%.

Also figure 4.10 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 54%, followed by non-excusable 24%, followed by excusable-compensable 16%, then concurrent 6% .

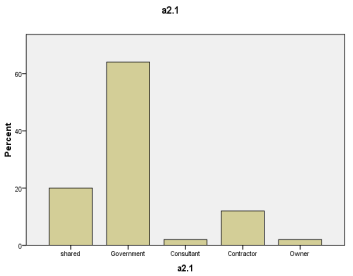


Figure4. 8 Responsibility of financial related– economic problems

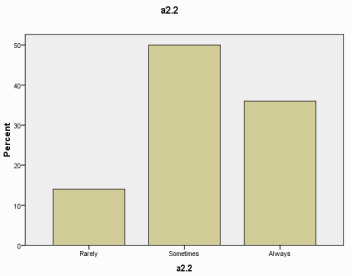


figure 4.9 Chance of occurrence of financial related– economic problems

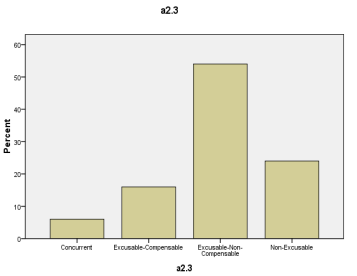


Figure4. 10 Type of delay of financial related–economic problems

4.3.1.3 Financial difficulties:

Figure 4.11 below shows the result of analysis of who is responsible of

this reasons of delay .The shared has received the highest percentage of 32%, followed by the contractor 26%, followed by owner 22%, followed by government 14% then consultant 6% .

And figure 4.12 below shows the result of analysis of chance of occurrence of this reasons of delay . Sometimes received the highest percentage of 50%, followed by the always 44%, then rarely 6%.

Also Figure 4.13 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 38%, followed by excusable-non-compensable 34%, followed by excusable-compensable 20%, then concurrent 8% .

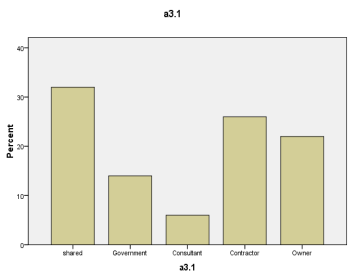


Figure4.11 Responsibility of financial related– financial difficulties

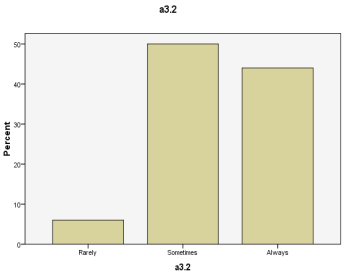


Figure4.12 Chance of occurrence of financial related– financial difficulties

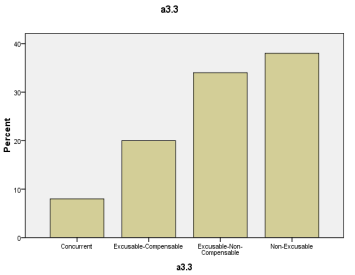


Figure 4.13 Type of delay of financial related– financial difficulties

4.3.1.4 Delay in progress payments:

Figure 4.14 below shows the result of analysis of who is responsible of this reasons of delay .the owner has received the highest percentage of 62%, followed by the contractor 12%, followed by consultant 12%, followed by shared 10% then government 4% .

And figure 4.15 below shows the result of analysis of chance of occurrence of this reasons of delay . Sometimes received the highest percentage of 50%, followed by the always 44%, then rarely 6%.

Also figure 4.16 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 44%, followed by non-excusable 32%, followed by excusable-compensable 16%, then concurrent 8% .

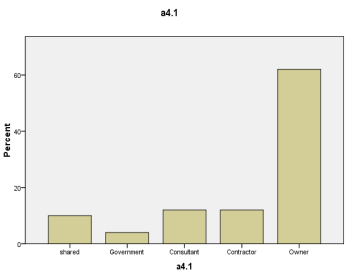


Figure 4.14 Responsibility of financial related– delay in progress payments

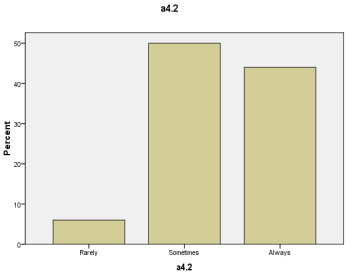


Figure 4.15 Chance of occurrence of financial related– delay in progress payments

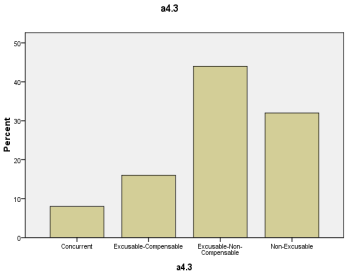


Figure 4.16 Type of delay of financial related – delay in progress payments

4.3.2 design related :

4.3.2.1 Delays in producing design documents design:

Figure 4.17 below shows the result of analysis of who is responsible of this reasons of delay . Consultant has received the highest percentage of responsibility 66%, followed by the contractor 12%, followed by owner 12%, followed by shared 10% then government 0% .

And figure 4.18 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes has received the highest percentage of 54%, followed by the always 34%, then rarely 12% .

Also figure 4.19 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 42%, followed by excusable-non-compensable 24%, followed by excusable-compensable 18%, then concurrent 16% .

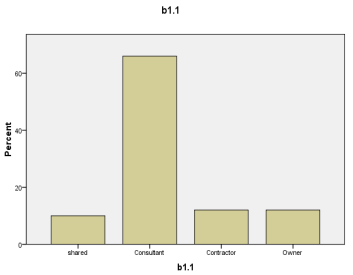


Figure 4.17 Responsibility of design related – delays in producing design documents design

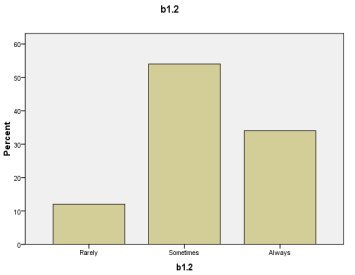


Figure 4.18 Chance of occurrence of design related – delays in producing design documents design

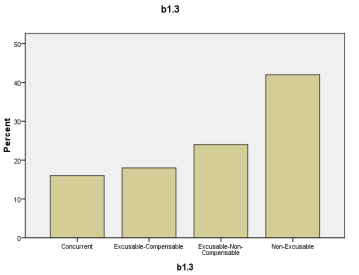


Figure 4.19 Type of delay of design related – delays in producing design documents design

4.3.2.2 Unclear and inadequate details in drawings design:

Figure 4.20 below shows the result of analysis of who is responsible of this reasons of delay . Consultant has received the highest percentage of 76%, followed by the contractor 20%, followed by shared 4%, followed by owner 0% then government 0% .

And figure 4.21 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes has received the highest percentage of 52%,

followed by the always 32%, then rarely 8% .

Also figure 4.22 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 42%, followed by excusable-non-compensable 36%, followed by excusable-compensable 18%, then concurrent 4% .

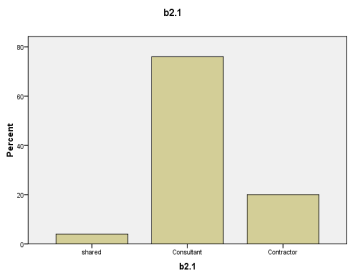


Figure 4. 20 Frequency of responsibility of design related – unclear and inadequate details in drawings design

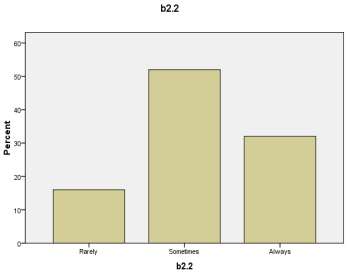


Figure 4.21 Chance of occurrence of design related – unclear and inadequate details in drawings design

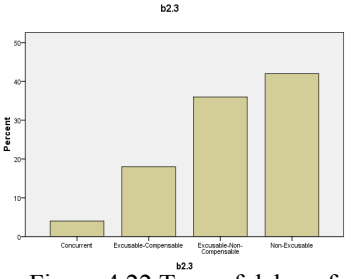


Figure 4.22 Type of delay of design related – unclear and inadequate details in drawings design

5.3.2.3 Complexity of project design:

Figure 4.23 below shows the result of analysis of who is responsible of this reasons of delay . Consultant has received the highest percentage of 52%, followed by the contractor 26%, followed by shared 12%, followed by owner 6% then government 2% .

And figure 4.24 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes has received the highest percentage of 42%, followed by the rarely 36%, then always 20% .

Also figure 4.25 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 48%, followed by non-excusable 24%, followed by excusable-compensable 22%, then concurrent 4% .

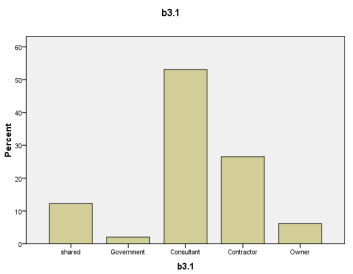


Figure 4.23 frequency of responsibility of design related – complexity of project design

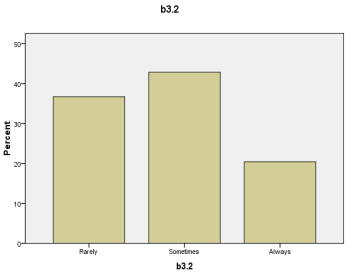


Figure 4.24 Frequency of chance of occurrence of design related – complexity of project design

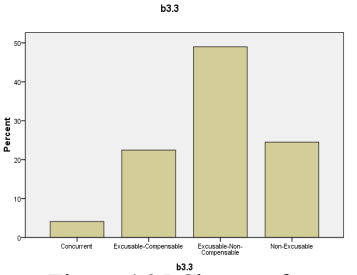


Figure 4.25 Chance of - type of delay of design related – complexity of project design

5.3.2.4 Misunderstanding of owners requirements:

Figure 4.26 below shows the result of analysis of who is responsible of this reasons of delay . Consultant has received the highest percentage of 58%, followed by the contractor 16%, followed by shared 14% followed by owner 10% then government 2% .

And figure 4.27 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes has received the highest percentage of 50%, followed by the rarely 34%, then always 14% .

Also figure 4.28 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 34%, followed by non-excusable 34%, followed by excusable-non compensable 22%, then concurrent 8% .

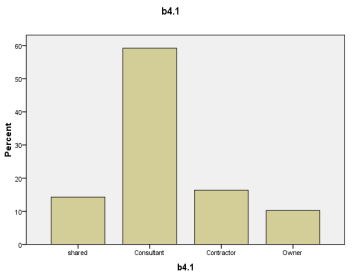


Figure 4.26 Responsibility of design related – misunderstanding of owners requirements

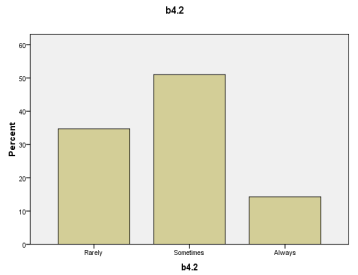


Figure 4.27 chance of occurrence of design related – misunderstanding of owners requirements

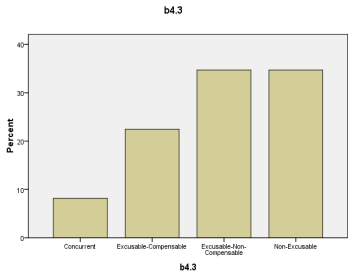


Figure 4.28 Frequency of chance of - type of delay of design related – misunderstanding of owners requirements

5.3.2.5 Inadequate design-team experience:

Figure 4.29 below shows the result of analysis of who is responsible of this reasons of delay . Consultant has received the highest percentage of 72%, followed by the contractor 20%, followed by owner 6%, followed by shared 2% then government 0% .

And figure 4.30 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes has received the highest percentage of 50%, followed by the rarely 30%, then always 20% .

Also figure 4.31 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 40%, followed by excusable-non-compensable 34%, followed by excusable-compensable 18%, then concurrent 8% .

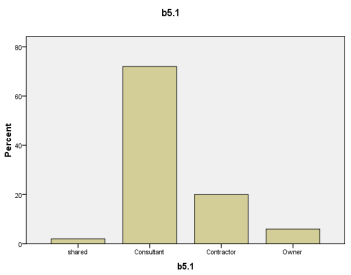


Figure 4.29 Responsibility of design related – inadequate design-team experience

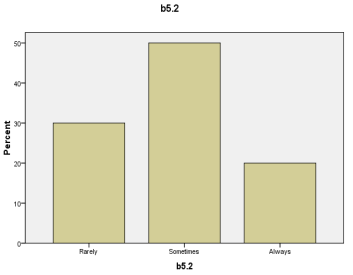


Figure 4.30 Frequency of chance of occurrence of design related – inadequate design-team experience

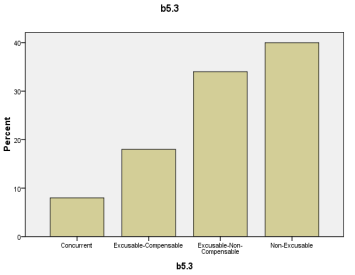


Figure 4.31 Chance of - type of delay of design related inadequate design-team experience

5.3.2.6 Un-use of advanced engineering design software:

Figure 4.32 below shows the result of analysis of who is responsible of this reasons of delay . Consultant has received the highest percentage of 80%, followed by the contractor 12%, followed by government 4%, followed by shared 4% then owner 0% .

And figure 4.33 below shows the result of analysis of chance of occurrence this reasons of delay . Rarely has received the highest percentage of 42%, followed by the sometimes 30%, then always 28% .

Also figure 4.34 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 42%, followed by excusable-compensable 24%, followed by excusable-non-compensable 22%, then concurrent 12% .

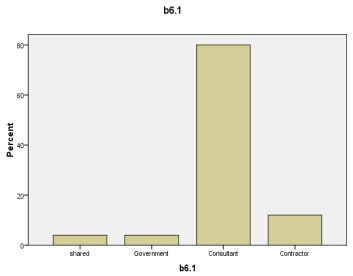


Figure 4.32 Frequency of responsibility of design related – un-use of advanced engineering design software

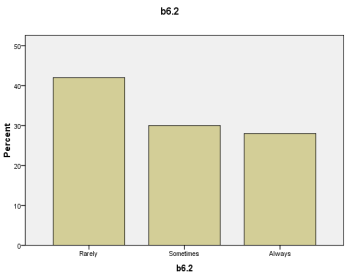


Figure 4.33 Chance of occurrence of design related – un-use of advanced engineering design software

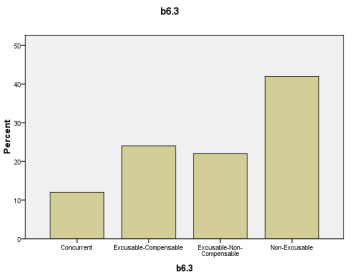


Figure 4.34 Frequency of chance of - type of delay of design related- un-use of advanced engineering design software

4.3.2.7 Change order:

Figure 4.35 below shows the result of analysis of who is responsible of this reasons of delay . Owner has received the highest percentage of 42%, followed by the consultant 28%, followed by contractor 14%, followed by shared 12% then government 4% .

And figure 4.36 below shows the result of analysis of chance of occurrence this reasons of delay . Always has received the highest percentage of 44%, followed by the sometimes 42%, then rarely 14% .

Also figure 4.37 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 36%, followed by excusable-compensable 36%, followed by non-excusable 20%, then concurrent 8% .

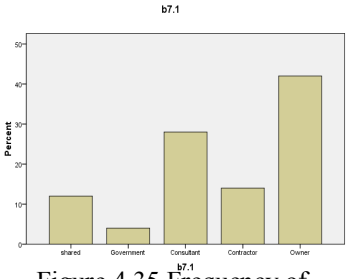


Figure 4.35 Frequency of responsibility of design related – change order

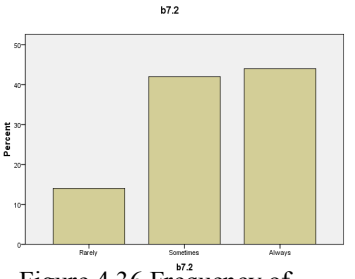


Figure 4.36 Frequency of chance of occurrence of design related – change order

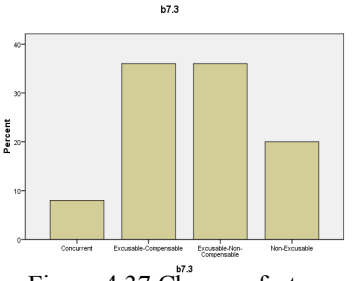


Figure 4.37 Chance of - type of delay of change order

4.3.3 Act of god related :

4.3.3.1 Wind damage:

Figure 4.38 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 42%, followed by the shared 28%, followed by government 14%, followed by consultant 10% then owner 6% .

And figure 4.39 below shows the result of analysis of chance of occurrence this reasons of delay . Chance of occurrence has rarely received the highest percentage of 52%, followed by the sometimes 34%, then always 14% .

Also figure 4.40 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 42%, followed by non-excusable 28%, followed by excusable-compensable 22%, then concurrent 8% .

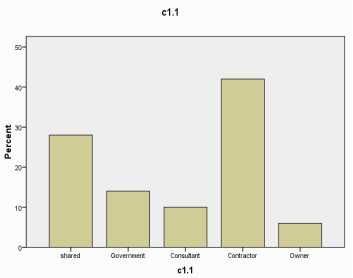


Figure 4.38 Frequency of responsibility of act of god related – wind damage

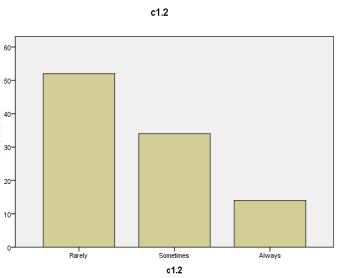


Figure 4.39 Frequency of chance of occurrence of act of god related – wind damage

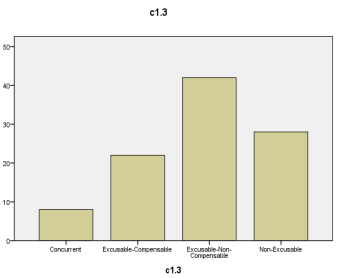


Figure 4. 40 Frequency of type of delay of act of god related – wind damage

4.3.3.2 Rain effect on construction activities:

Figure 4.41 below shows the result of analysis of who is responsible of

this reasons of delay . contractor has received the highest percentage of 54%, followed by the shared 20%, followed by government 14%, followed by consultant 10% then owner 2%.

And figure 4.42 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 44%, followed by the always 32%, then rarely 24% .

Also figure 4.43 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 38%, followed by non-excusable 36%, followed by excusable-compensable 20%, then concurrent 6% .

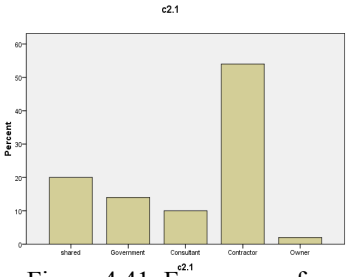


Figure 4.41 Frequency of responsibility of act of god related – rain effect on construction activities

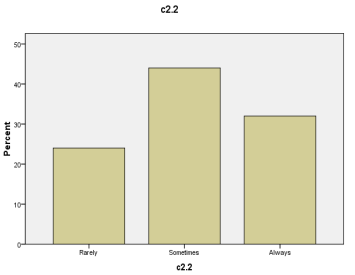


Figure 4.42 Frequency of chance of occurrence of act of god related – rain effect on construction activities

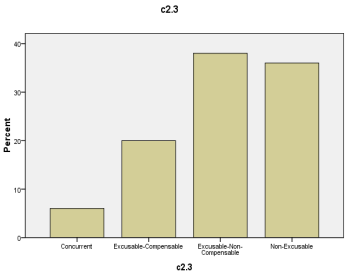


Figure 4.43 Frequency of type of delay of act of god related – rain effect on construction activities

4.3.3.3 Hot weather effect on construction activities:

Figure 4.44 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 54%, followed by the consultant 16%, followed by government 14%, followed by shared 14% then owner 2%.

And figure 4.45 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 36%, followed by the always 36%, then rarely 28% .

Also figure 4.46 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 52%, followed by non-excusable 28%, followed by excusable-compensable 16%, then concurrent 4% .

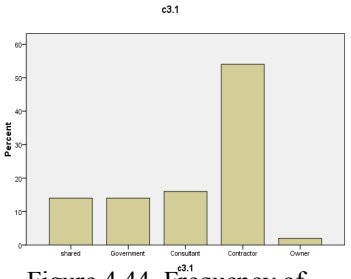


Figure 4.44 Frequency of responsibility of act of god related – hot weather effect on construction activities

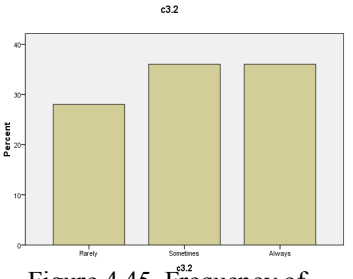


Figure 4.45 Frequency of chance of occurrence of act of god related – hot weather effect on construction activities

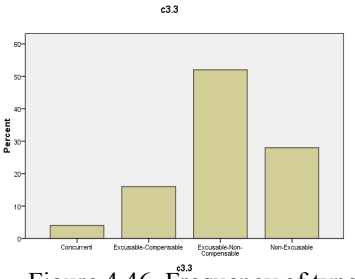


Figure 4.46 Frequency of type of delay of act of god related - hot weather effect on construction activities

4.3.3.4 Fire:

Figure 4.47 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 52%, followed by the shared 16%, followed by government 14%, followed by consultant 12% then owner 6%.

And figure 4.48 below shows the result of analysis of chance of occurrence this reasons of delay . Rarely received the highest percentage of 42%, followed by the sometimes 34%, then always 24% .

Also figure 4.49 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 40%, followed by non-excusable 38%, followed by excusable-compensable 16%, then concurrent 6% .

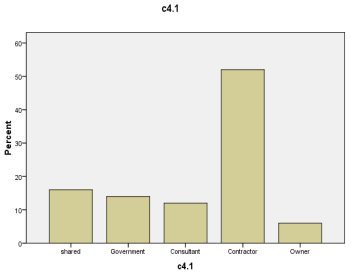


Figure 4.47 Frequency of Responsibility of Act of god related – Fire

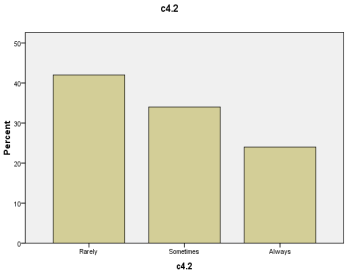


Figure 4.48 Frequency of Chance of Occurrence of Act of god related - Fire

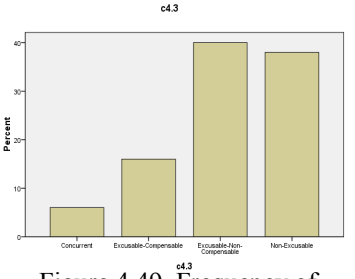


Figure 4.49 Frequency of Type of Delay of Act of god related – Fire

4.3.4 Management related:

4.3.4.1 Conflicts between parties:

Figure 4.50 below shows the result of analysis of who is responsible of this reasons of delay . Shared has received the highest percentage of 34%, followed by the contractor 24%, followed by consultant 22%, followed by t owner 12% then government 8% .

And figure 4.51 below shows the result of analysis of chance of occurrence this reasons of delay . Always received the highest percentage of 46%, followed by the sometimes 36%, then rarely 18%.

Also figure 4.52 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 40%, followed by excusable-non-compensable 32%, followed by excusable-compensable 14%, then concurrent 14% .

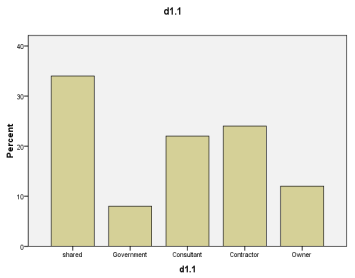


Figure 4.50 Responsibility of management related – conflicts between parties

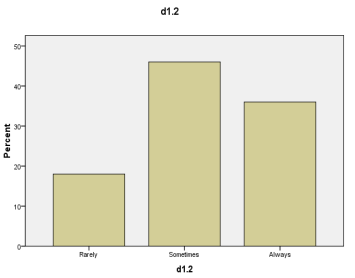


Figure 451 Chance of occurrence of management related – conflicts between parties

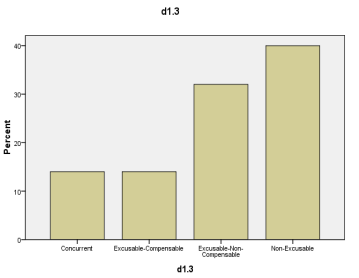


Figure 4.52 Type of delay of management related – conflicts between parties

4.3.4.2 Poor communication and coordination on site:

Figure 4.53 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 40%, followed by the consultant 28%, followed by shared 24%, followed by owner 4% then

And figure 4.54 below shows the result of analysis of chance of occurrence this reasons of delay .Sometimes received the highest percentage of 48%, followed by the always 40%, then rarely 12%.

Also figure 4.55 below shows the result of analysis of the type of the delay of this reasons of delay .Non-excusable received the highest percentage of 48%, followed by Excusable-non-compensable 30%, followed by excusable-compensable 12%, then concurrent 10% .

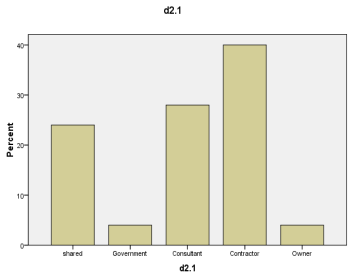


Figure 4.53 Responsibility of management related – poor communication and coordination on site

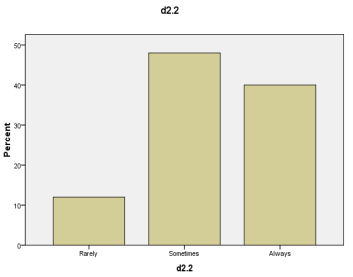


Figure 4.54 Chance of Occurrence of management related – poor communication and coordination on site

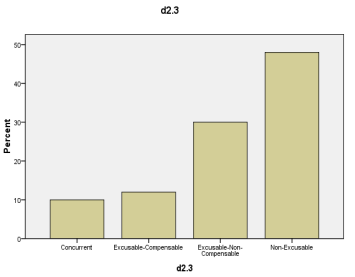


Figure 4.55 Type of delay of management related – poor communication and coordination on site

4.3.4.3 Poor site management:

Figure 4.56 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 68%, followed by the consultant 16%, followed by shared 12%, followed by owner 4% then government0% .

And figure 4.57 below shows the result of analysis of chance of occurrence this reasons of delay .Sometimes received the highest percentage of 56%, followed by the always 34%, then rarely 10% .

Also figure 4.58 below shows the result of analysis of the type of the delay of this reasons of delay .Non-excusable received the highest percentage of 48%, followed by excusable-non-compensable 34%, followed by excusable-compensable 10%, then concurrent 8% .

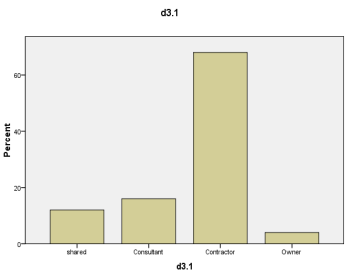


Figure 4.56 Responsibility of management related - poor site management

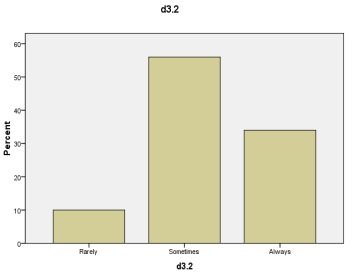


Figure 4.57 Chance of occurrence of management related – poor site management

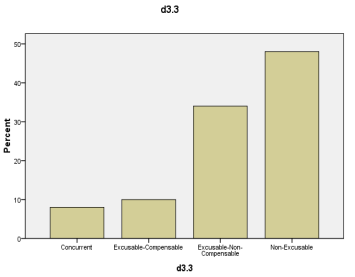


Figure 4.58 Type of delay of management related – Poor site management

4.3.4.4 Poor site supervision:

Figure 4.59 below shows the result of analysis of who is responsible of this reasons of delay . Consultant has received the highest percentage of 54%, followed by the contractor 36%, followed by shared 6%, followed by owner 2% then government 2% .

And figure 4.60 below shows the result of analysis of chance of occurrence this reasons of delay .Sometimes received the highest percentage of 50%, followed by the always 34%, then rarely 16% .

Also figure 4.61 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 52%, followed by excusable-non-compensable 28%, followed by excusable-compensable 14%, then concurrent 6% .

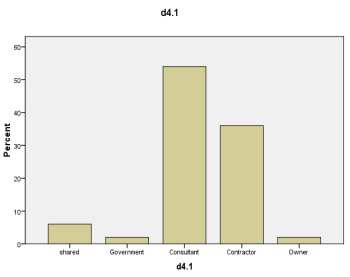


Figure 4.59 Responsibility of management related - poor site supervision

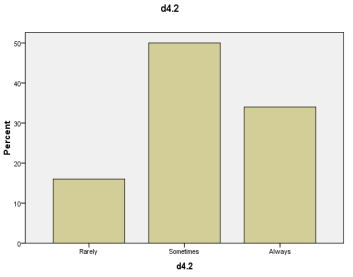


Figure 4.60 Chance of occurrence of management related – Poor site supervision

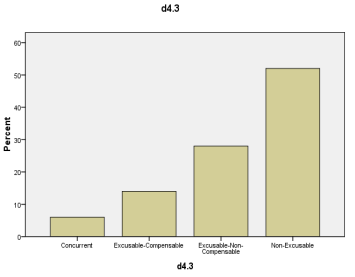


Figure 4.61 Type of delay of management related – poor site supervision

4.3.4.5 Application of safety rules during construction:

Figure 4.62 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 44%, followed by the consultant 32%, followed by shared 12%, followed by government 12% then owner 0% .

And figure 4.63 below shows the result of analysis of chance of occurrence this reasons of delay . Always received the highest percentage of 48%, followed by the sometimes 40%, then rarely 12% .

Also figure 4.64 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 46%, followed by excusable-non-compensable 32%, followed by excusable-compensable 18%, then concurrent 4% .

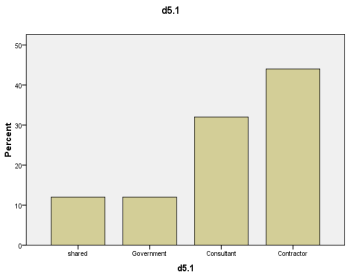


Figure 4.62 Responsibility of management related - application of safety rules during construction

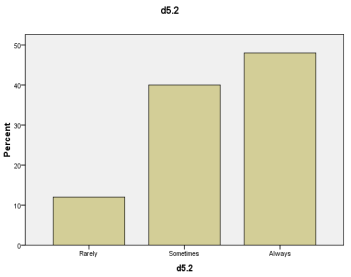


Figure 4.63 Chance of occurrence of management related – application of safety rules during construction

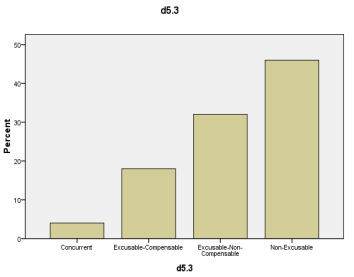


Figure 4.64 Type of delay of management related – application of safety rules during construction

4.3.4.6 Delay in performing final inspection and certification:

Figure 4.65 below shows the result of analysis of who is responsible of this reasons of delay . Consultant has received the highest percentage of 50%, followed by the contractor 28%, followed by shared 12%, followed by government 6% then owner 2% .

And figure 4.66 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 56%, followed by the always 28%, then rarely 16% .

Also figure 4.67 below shows the result of analysis of the type of the delay

of this reasons of delay . Non-excusable received the highest percentage of 40%, followed by excusable-non-compensable 32%, followed by excusable-compensable 20%, then concurrent 6% .

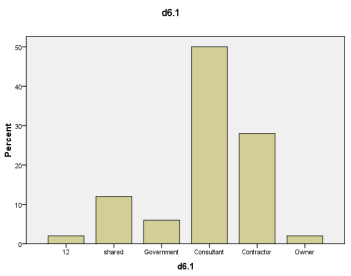


Figure 4.65 Responsibility of management related - delay in performing final inspection and certification

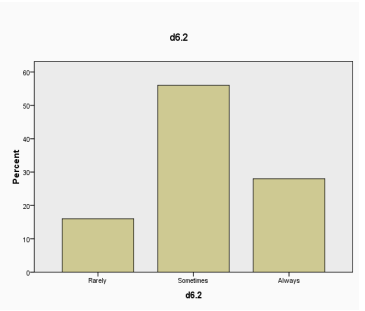


Figure 4.66 Chance of occurrence of management related – delay in performing final inspection and certification

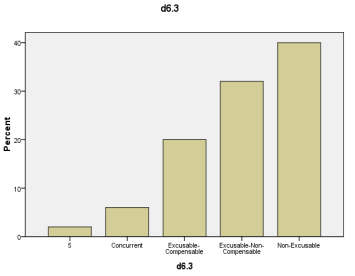


Figure 4.67 Type of delay of management related – delay in performing final inspection and certification

4.3.4.7 Slowness in decision making:

Figure 4.68 below shows the result of analysis of who is responsible of this reasons of delay . Consultant has received the highest percentage of 48%, followed by the shared 24%, followed by contractor 20%, followed by government 4% then owner 4% .

And figure 4.69 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 42%, followed by the always 42%, then rarely 16% .

Also figure 4.70 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 46%, followed by non-excusable 34%, followed by excusable-compensable 18% then concurrent 2% .

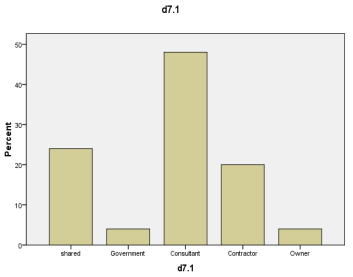


Figure 4.68 Responsibility of management related -Slowness in decision making

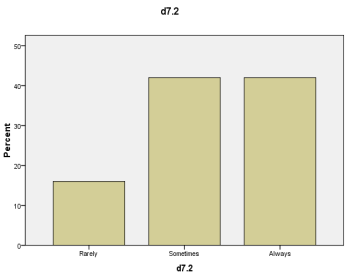


Figure 4.69 Chance of occurrence of management related - slowness in decision making

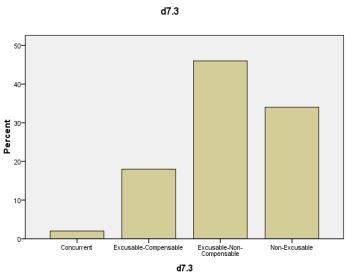


Figure 4.70 Type of delay of management related – slowness in decision making

4.3.4.8 Rework due to errors during construction:

Figure 4.71 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 54%, followed by the consultant 28%, followed by shared 8%, followed by government 8% then owner 2% .

And figure 4.72 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 46%, followed by the always 38%, then rarely 16% .

Also figure 4.73 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 48%, followed by non-excusable 26%, followed by excusable-compensable 22%, then concurrent 4% .

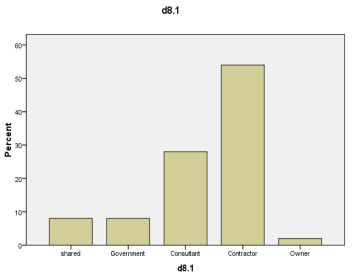


Figure 4.71 Responsibility of management related - rework due to errors during construction

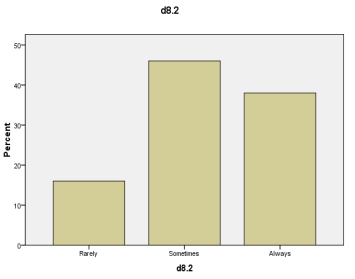


Figure 4.72 Chance of occurrence of management related - rework due to errors during construction

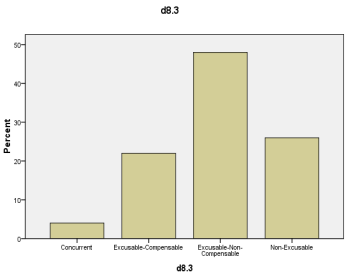


Figure 4.73 Type of delay of management related – rework due to errors during construction

4.3.4.9 Rework due to errors during construction:

Figure 4.74 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 56%, followed by the consultant 22%, followed by shared 14%, followed by owner 6% then government 2% .

And figure 4.75 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 52%, followed by the always 34%, then rarely 14% .

Also figure 4.76 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 52%, followed by non-excusable 30%, followed by excusable-compensable 12%, then concurrent 6% .

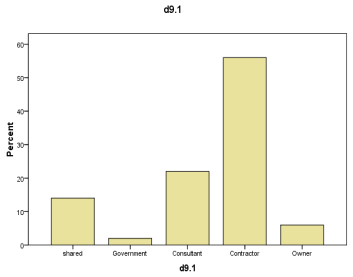


Figure 4.74 Responsibility of management related – ineffective planning and scheduling of project

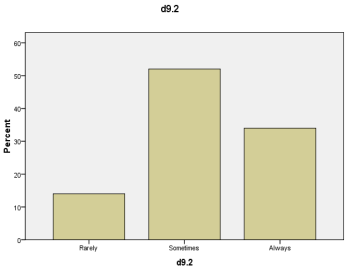


Figure 4.75 Chance of occurrence of management related – ineffective planning and scheduling of project

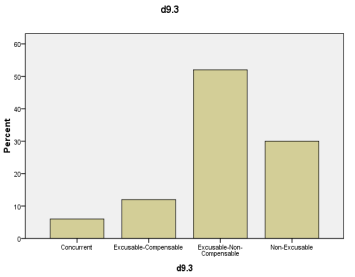


Figure 4.76 Type of delay of management related – ineffective planning and scheduling of project

4.3.4.10 Improper construction methods implemented:

Figure 4.77 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 60%, followed by the consultant 26%, followed by shared 10%, followed by owner 2% then government 2% .

And figure 4.78 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 58%,

followed by the always 28%, then rarely 14% .

Also figure 4.79 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 46%, followed by excusable-non-compensable 42%, followed by excusable-compensable 10%, then concurrent 2% .

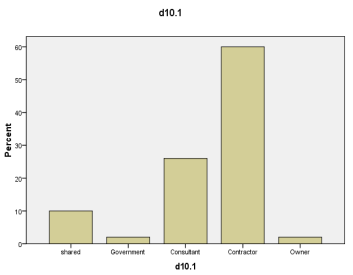


Figure 4.77 Responsibility of management related - improper construction methods implemented

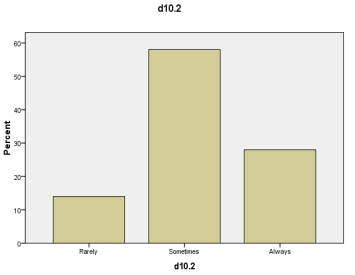


Figure 4.78 Chance of occurrence of management related- improper construction methods implemented

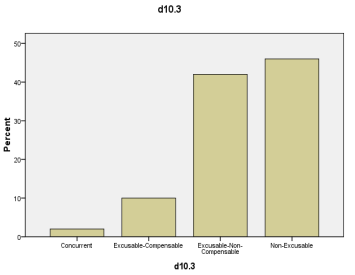


Figure 4.79 Type of delay of management related - improper construction methods implemented

4.3.4.11 Poor managerial skills:

Figure 4.80 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 44%, followed by the consultant 22%, followed by shared 22%, followed by government 12% then owner 0% .

And figure 4.81 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 52%, followed by the always 28%, then rarely 20% .

Also figure 4.82 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 46%, followed by non-excusable 34%, followed by excusable-compensable 16%, then concurrent 4% .

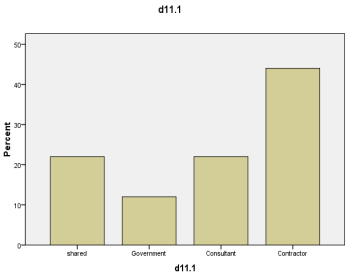


Figure 4.80 Responsibility of management related - poor Managerial Skills

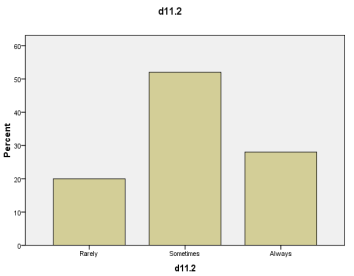


Figure 4.81 Chance of occurrence of management related - poor managerial Skills

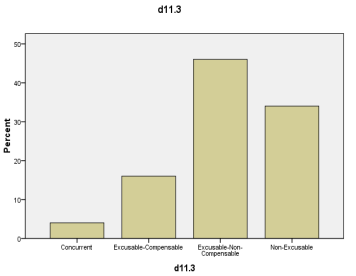


Figure 4.82 Type of Delay of management related - poor managerial Skills

4.3.4.12 Changes in government regulations and laws:

Figure 4.83 below shows the result of analysis of who is responsible of this reasons of delay . Government has received the highest percentage of 60%, followed by the shared 18%, followed by contractor 10%, followed by owner 8% then consultant 4% .

And figure 4.84 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 44%, followed by the rarely 30%, then always 26% .

Also figure 4.85 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 54%, followed by excusable-compensable 22%, followed by non-excusable 14%, then concurrent 10% .

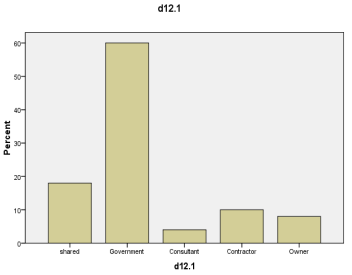


Figure 4.83 Responsibility of management related - changes in government regulations and laws

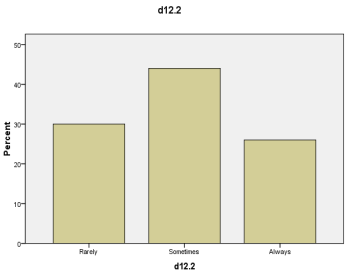


Figure 4.84 Chance of occurrence of management related - changes in government regulations and laws

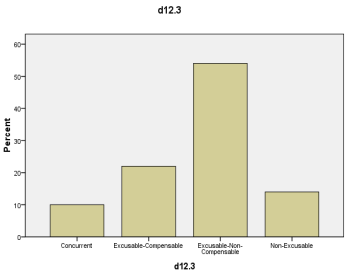


Figure 4.85 Type of delay of management related - changes in government regulations and laws

4.3.4.13 Problem with neighbors:

Figure 4.86 below shows the result of analysis of who is responsible of this reasons of delay . Owner has received the highest percentage of 46%, followed by the contractor 22%, followed by government 16%, followed by consultant 12% then shared 4% .

And figure 4.87 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 48%, followed by the rarely 42%, then always 10% .

Also figure 4.88 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 34%, followed by excusable-compensable 28%, followed by non-excusable 22%, then concurrent 16% .

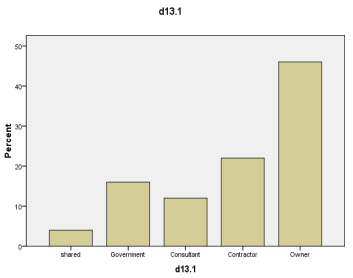


Figure 4.86 Responsibility of management related - problem with neighbors

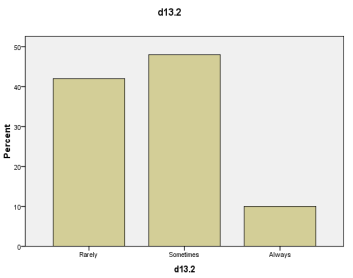


Figure 4.87 Chance of occurrence of management related - problem with neighbors

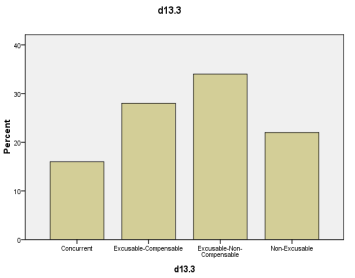


Figure 4.88 Type of delay of management related - problem with neighbors

4.3.5 Construction Related:

4.3.5.1 Delay in obtaining permits for construction:

Figure 4.89 below shows the result of analysis of who is responsible of this reasons of delay .Owner has received the highest percentage of 36%, followed by the contractor 30%, followed by government 12%, followed by shared 12% then consultant 10% .

And Figure 4.90 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage

of 54%, followed by the always 30%, then rarely 16% .

Also Figure 4.91 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 38%, followed by non-excusable 32%, followed by excusable-compensable 26%, then concurrent 4% .

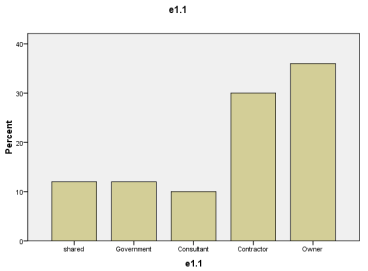


Figure 4.89 Responsibility of construction related – delay in obtaining permits for construction

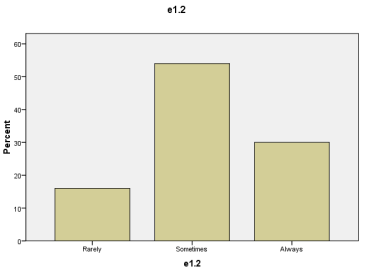


Figure 4.90 Chance of occurrence of construction related – delay in obtaining permits for construction

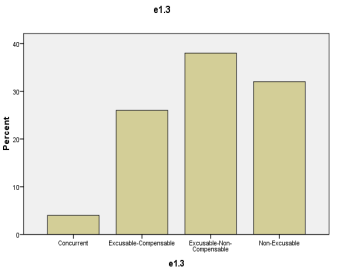


Figure4.91 Typeofdelayof construction related – delay in obtaining permits for construction

4.3.5.2 Inspections:

Figure 4.92 below shows the result of analysis of who is responsible of this reasons of delay .Consultant has received the highest percentage 40%, followed by the contractor 24%, followed by government 24%, followed by shared 10% then owner 2% .

And figure 4.93 below shows the result of analysis of chance of occurrence this reasons of delay . Rarely received the highest percentage 36%, followed by the sometimes 34%, then always 30% .

Also figure 4.94 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage 34%, followed by excusable-non-compensable 30%, followed by excusable-compensable 20%, then concurrent 16% .

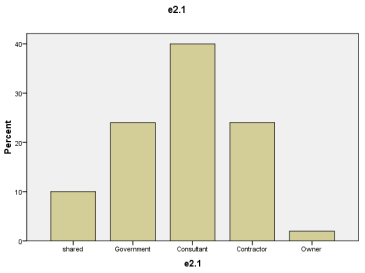


Figure 4.92 Responsibility of construction related – inspections

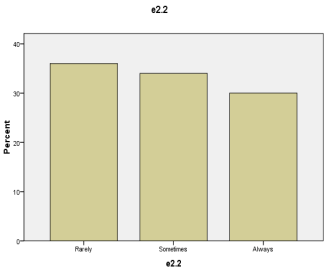


Figure 4.93 Chance of occurrence of construction related – inspections

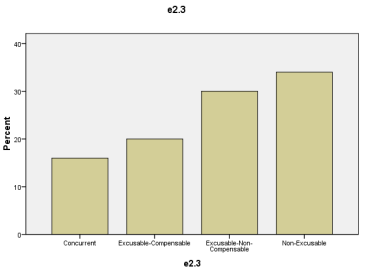


figure 4.94 Type of delay of construction related – inspections

4.3.5.3 Delay in materials delivery:

Figure 4.95 below shows the result of analysis of who is responsible of this reasons of delay .Contractor has received the highest percentage of 70%, followed by the consultant 14%, followed by owner 8%, followed by shared 6% then government 2% .

And figure 4.96 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 46%, followed by the always 44%, then rarely 10% .

Also figure 4.97 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 52%, followed by non-excusable 20%, followed by excusable-compensable 20%, then concurrent 8% .

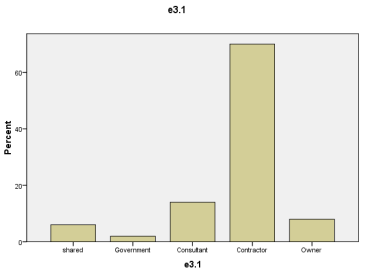


Figure 4.95 Responsibility of construction related – delay in materials delivery

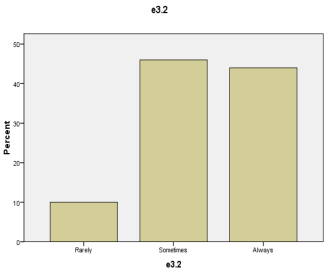


Figure 4.96 Chance of occurrence of construction related – delay in materials delivery

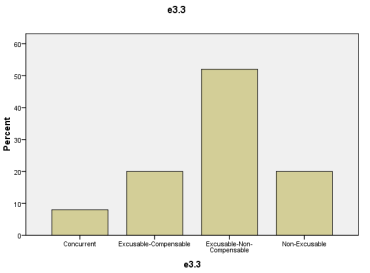


Figure 4.97 Type of delay of construction related – delay in materials delivery

4.3.5.4 Changes in material types and specifications during construction:

Figure 4.98 below shows the result of analysis of who is responsible of this reasons of delay .Consultant has received the highest percentage of 38%, followed by the contractor 20%, followed by shared 20%, followed by owner 18% then government 4% .

And figure 4.99 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 48%, followed by the rarely 22%, then always 15% .

Also figure 4.100 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 40%, followed by excusable-compensable 34%, followed by non-excusable 20%, then concurrent 6% .

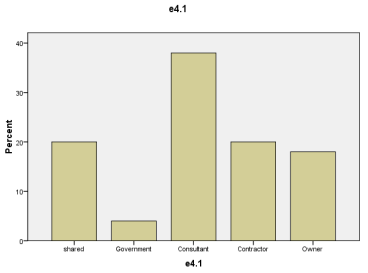


Figure 4.98 Responsibility of construction related – changes in material types and specifications during construction

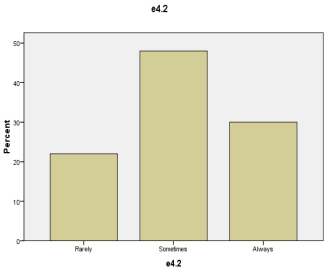


Figure 4.99 Chance of occurrence of construction related – changes in material types and specifications during construction

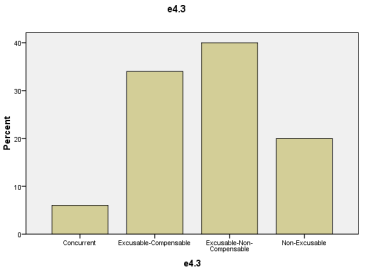


Figure 4.100 Type of delay of construction related – changes in material types and specifications during construction

4.3.5.5 Changes in material types and specifications during construction:

Figure 4.101 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 50%, followed by the consultant 20%, followed by shared 12%, followed by owner 10% then government 8% .

And figure 4.102 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 52%, followed by the always 28%, then rarely 20% .

Also figure 4.103 below shows the result of analysis of the type of the

delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 46%, followed by excusable-compensable 24%, followed by non-excusable 22%, then concurrent 8%.

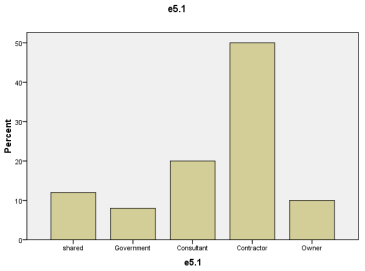


Figure 4.101 Responsibility of construction related – delay in manufacturing special building materials

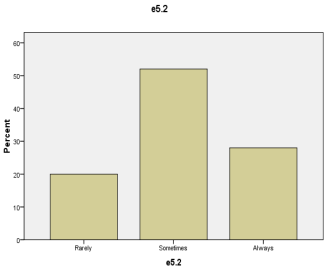


Figure 4.102 Chance of occurrence of construction related – delay in manufacturing special building materials

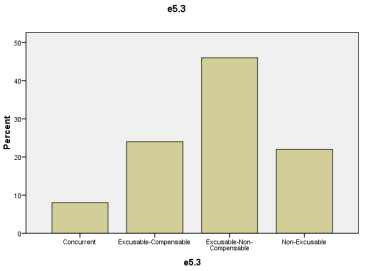


Figure 4.103 Type of delay of construction related – delay in manufacturing special building materials

4.3.5.6 Late procurement of materials:

Figure 4.104 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 64%, followed by the consultant 14%, followed by owner 10%, followed by shared 8% then government 4% .

And figure 4.105 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 64%, followed by the always 28%, then rarely 8% .

Also figure 4.106 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 42%, followed by non-excusable 32%, followed by excusable-compensable 22%, then concurrent 4% .

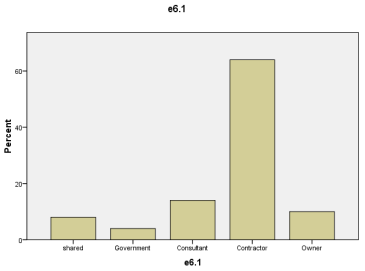


Figure 4.104 Responsibility of construction related – late procurement of materials

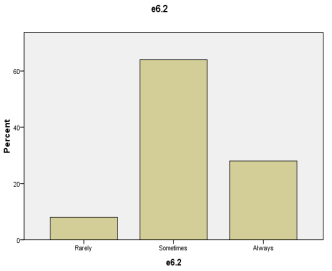


Figure 4.105 Chance of occurrence of construction related – late procurement of materials

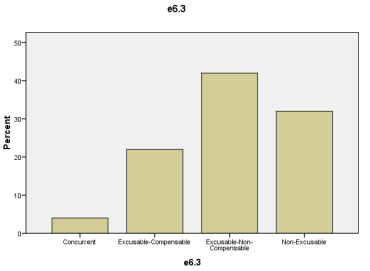


Figure 4.106 Type of delay of construction related – late procurement of materials

4.3.5.7 Late procurement of materials:

Figure 4.107 below shows the result of analysis of who is responsible of this reasons of delay . Consultant has received the highest percentage of 32%, followed by the contractor 24%, followed by owner 24%, followed by shared 12% then government 6% .

And figure 4.108 below shows the result of analysis of chance of occurrence this reasons of delay . Always received the highest percentage of 48%, followed by the sometimes 46%, then rarely 6%.

Also figure 4.109 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 48%, followed by non-excusable 34%, followed by excusable-compensable 16%, then concurrent 2% .

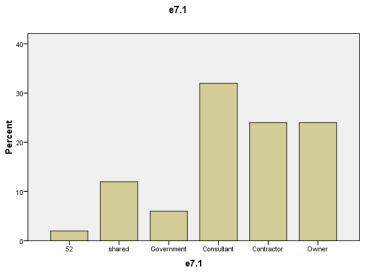


Figure 4.107 Responsibility of construction related – late in selection of finishing materials due to availability of many types in market

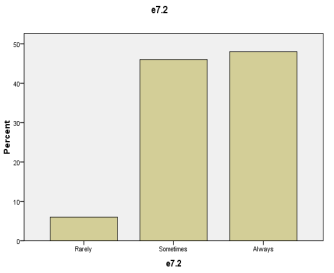


Figure 4.108 Chance of occurrence of construction related – late in selection of finishing materials due to availability of many types in market

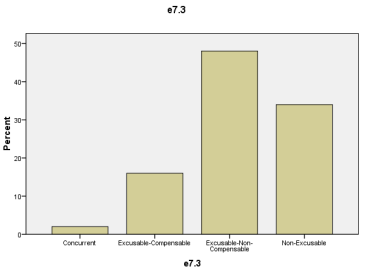


Figure 4.109 Type of delay of construction related – late in selection of finishing materials due materials due to availability of many types in market

4.3.5.8 Lack of Qualified Craftsmen:

Figure 4.110 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 70%, followed by the shared 14%, followed by consultant 6%, followed by government 6% then owner 4% .

And figure 4.111 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 56%, followed by the always 34%, then rarely 10% .

Also figure 4.112 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 46%, followed by excusable-non-compensable 36%, followed by excusable-Compensable 12%, then concurrent 6% .

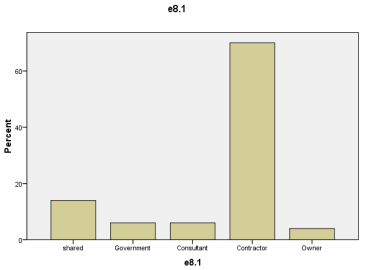


Figure 4.110 Responsibility of construction related – lack of qualified craftsmen

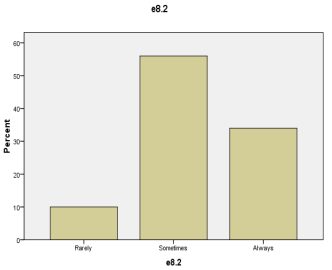


Figure 4.111 Chance of occurrence of construction related – lack of qualified craftsmen

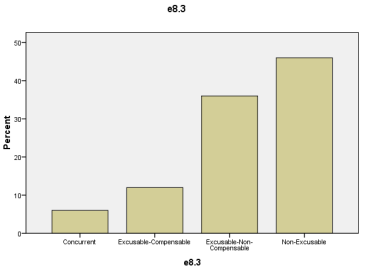


Figure 4.112 Type of delay of construction related – lack of qualified craftsmen

4.3.5.9 Shortage of labors:

Figure 4.113 below shows the result of analysis of who is responsible of this reasons of delay .Contractor has received the highest percentage of 74%, followed by the government 12%, followed by consultant 8%, followed by shared 4% then owner 2% .

And figure 4.114 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 48%, followed by the always 40%, then rarely 12% .

Also figure 4.115 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 46%, followed by excusable-non-compensable 34%, followed by excusable-compensable 14%, then concurrent 6% .

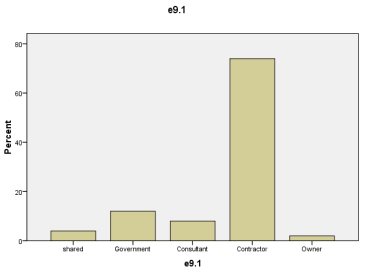


Figure 4.113 Responsibility of construction related – shortage of labors

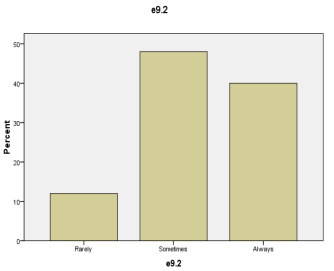


Figure 4.114 Chance of occurrence of construction related – shortage of labors

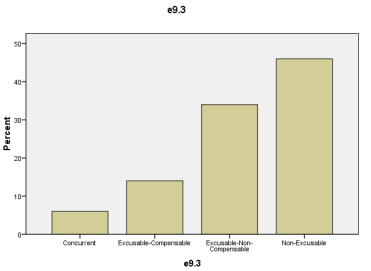


Figure 4.115 Type of delay of construction related – shortage of labors

4.3.5.10 Nationality of labors:

Figure 4.116 below shows the result of analysis of who is responsible of this reasons of delay .Contractor has received the highest percentage of 54%, followed by the government 16%, followed by consultant 16%, followed by shared 10% then owner 4% .

And figure 4.117 below shows the result of analysis of chance of occurrence this reasons of delay . Always received the highest percentage of 44%, followed by the sometimes 40%, then rarely 16% .

Also figure 4.118 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 42%, followed by excusable-non-compensable 32%, followed by excusable-compensable 18%, then concurrent 8% .

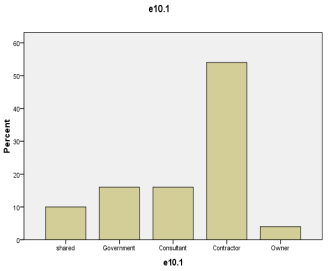


Figure 5.116 Responsibility of construction related – nationality of labors

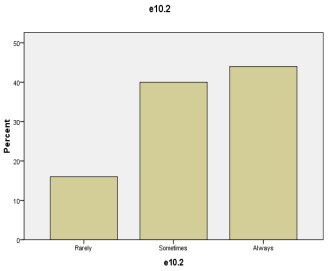


Figure 4.117 Chance of occurrence of construction related – nationality of labors

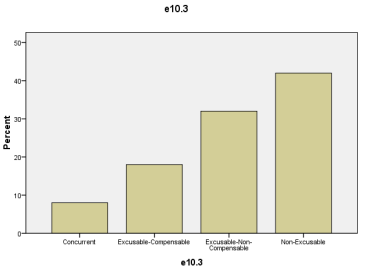


Figure 4.118 Type of delay of construction related – nationality of labors

4.3.5.11 Personal conflicts among labors:

Figure 4.119 below shows the result of analysis of who is responsible of this reasons of delay .Contractor has received the highest percentage of 68%, followed by the consultant 16%, followed by government 8%, followed by shared 4% then owner 2% .

And figure 4.120 below shows the result of analysis of chance of occurrence this reasons of delay . Always received the highest percentage of 38%, followed by the sometimes 36%, then rarely 12% .

Also figure 4.121 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 42%, followed by non-excusable 38%, followed by excusable-compensable 12%, then concurrent 6% .

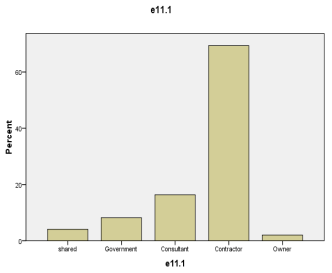


Figure 4.119 Responsibility of construction related – personal conflicts among labors

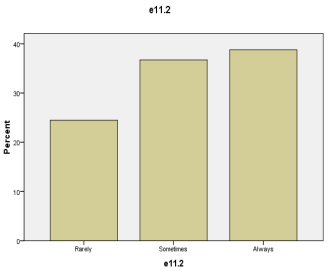


Figure 4.120 Chance of occurrence of construction related – personal conflicts among labors

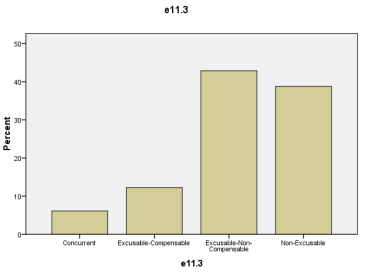


Figure 4.121 Type of delay of construction related – personal conflicts among labors

4.3.5.12 Poor subcontractor performance:

Figure 4.122 below shows the result of analysis of who is responsible of this reasons of delay .Contractor has received the highest percentage of 74%, followed by the consultant 10%, followed by shared 8%, followed by government 4% then owner 4% .

And figure 4.123 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage

of 52%, followed by the always 40%, then rarely 6% .

Also figure 4.124 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 54%, followed by excusable-non-compensable 36%, followed by excusable-compensable 8%, then concurrent 2% .

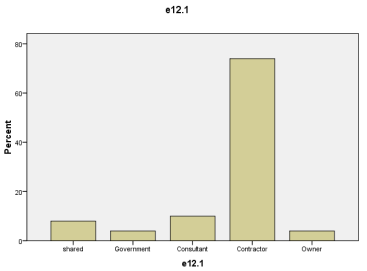


Figure 4.122 Responsibility of construction related – poor subcontractor performance

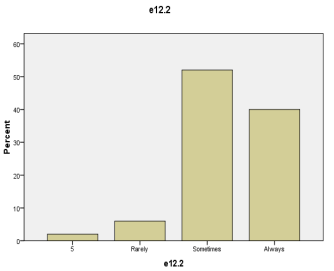


Figure 4.123 Chance of occurrence of construction related – poor subcontractor performance

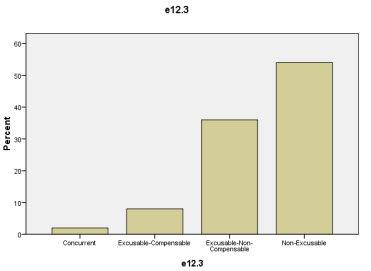


Figure 4.124 Type of delay of construction related – poor subcontractor performance

5.3.5.13 Poor subcontractor performance:

Figure 4.125 below shows the result of analysis of who is responsible of this reasons of delay .Contractor has received the highest percentage of 74%, followed by the consultant 18%, followed by shared 4%, followed by government 2% then owner 2% .

And figure 4.126 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 50%, followed by the always 32%, then rarely 16% .

Also figure 4.127 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 46%, followed by excusable-non-compensable 38%, followed by excusable-compensable 8%, then concurrent 8% .

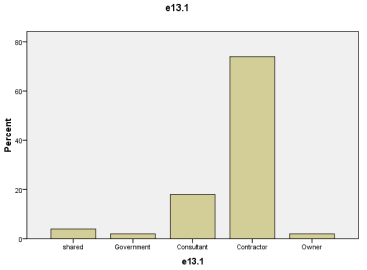


Figure 4.125 Responsibility of construction related – construction mistakes

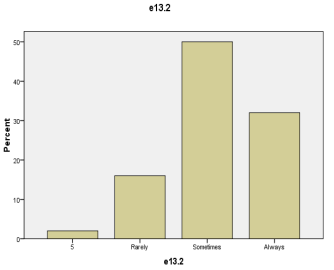


Figure 4.126 Chance of occurrence of construction related – construction mistakes

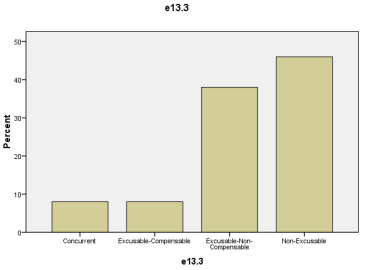


Figure 4.127 Type of delay of construction related – construction mistakes

4.3.5.14 Equipment availability:

Figure 4.128 below shows the result of analysis of who is responsible of this reasons of delay .Contractor has received the highest percentage of 84%, followed by the consultant 8%, followed by government 6%, followed by t shared 2% then owner 0% .

And Figure 4.129 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 48%, followed by the always 48%, then rarely 4% .

Also Figure 4.130 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 44%, followed by excusable-non-compensable 36%, followed by excusable-compensable 16%, then concurrent 4% .

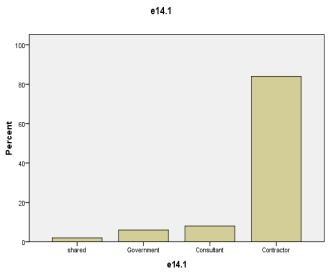


Figure 4.128 Responsibility of construction related – equipment availability

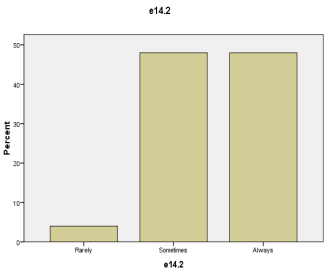


Figure 4.129 Chance of occurrence of construction related – equipment availability

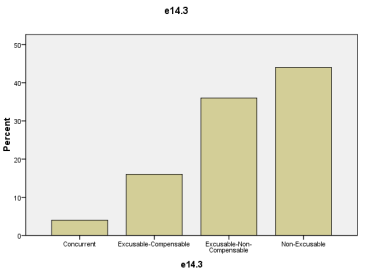


Figure 4.130 Type of delay of construction related – equipment availability

4.3.6 Social and behavioral related:

4.3.6.1 Lack of trained craft workers:

Figure 4.131 below shows the result of analysis of who is responsible of

this reasons of delay .Contractor has received the highest percentage of 58%, followed by the government 20%, followed by shared12 %, followed by consultant 10% then owner 0%.

And figure 4.132 below shows the result of analysis of chance of occurrence this reasons of delay . Always has received the highest percentage of 56%, followed by the sometimes 38%, then rarely 4% .

Also figure 4.133 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 42%, followed by excusable-non-compensable 26%, followed by excusable-compensable 20%, then concurrent 10% .

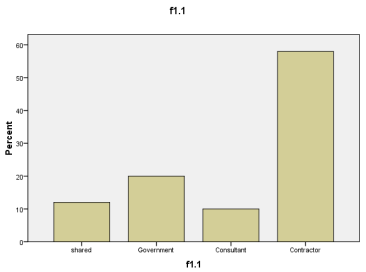


Figure 4.131 Responsibility of social and behavioral related – lack of trained craft workers

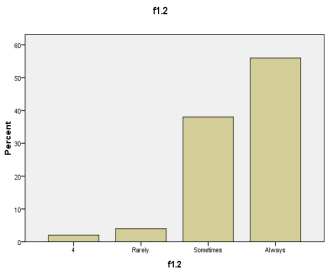


Figure 4.132 Chance of occurrence of social and behavioral related – lack of trained craft workers

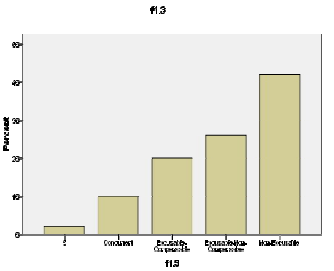


Figure 4.133 Type of delay of social and behavioral related – lack of trained craft workers

4.3.6.2 A large number of illiterate workers:

Figure 4.134 below shows the result of analysis of who is responsible of this reasons of delay .Contractor has received the highest percentage of 60%, followed by the government 14%, followed by shared 14 %, followed by consultant 10% then owner 2% .

And figure 4.135 below shows the result of analysis of chance of occurrence this reasons of delay . Always has received the highest percentage of 46%, followed by the sometimes 38%, then rarely 16% .

Also figure 4.136 below shows the result of analysis of the type of the delay of this reasons of delay . Excusable-non-compensable received the highest percentage of 44%, followed by non-excusable 34%, followed by excusable-compensable 10%, then concurrent 10%.

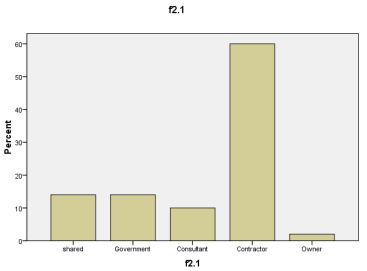


Figure 4.134 Responsibility of Social and behavioral related – large number of illiterate workers

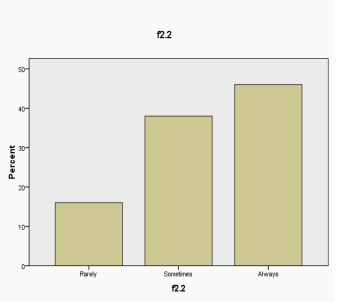


Figure 4.135 Chance of occurrence of social and behavioral related – large number of illiterate workers

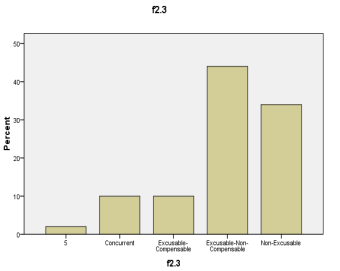


Figure 4.136 Type of delay of Social and behavioral related - large number of illiterate workers

4.3.6.3 unqualified foreman:

Figure 4.137 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 70%, followed by the consultant 12%, followed by government 10 %, followed by shared 8% then owner 2% .

And figure 4.138 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes has received the highest percentage of 52%, followed by the always 36%, then rarely 10% .

Also figure 4.139 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 34%, followed by excusable-non-compensable 30%, followed by excusable-compensable 22%, then concurrent 14% .

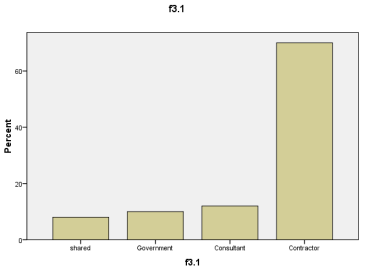


Figure 4.137 Responsibility of social and behavioral related – unqualified foreman

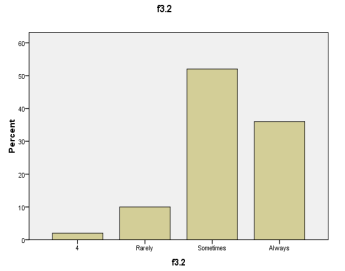


Figure 4.138 Chance of occurrence of social and behavioral related – unqualified foreman

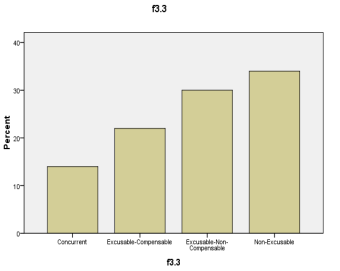


Figure 4.139 Type of delay of social and behavioral related - unqualified foreman

4.3.6.4 unqualified foreman:

Figure 4.140 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 62%, followed by the consultant 14%, followed by government 10 %, followed by shared 10% then owner 4% .

And figure 4.141 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes has received the highest percentage of 46%, followed by the always 40%, then rarely 14%.

Also figure 4.142 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 44%, followed by excusable-non-compensable 30%, followed by excusable-compensable 16%, then concurrent 8% .

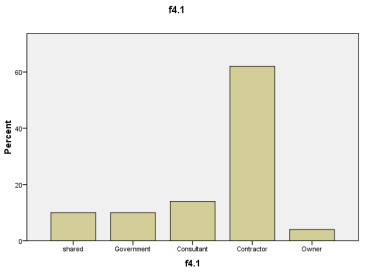


Figure 4.140 Responsibility of social and behavioral related – seasonal employment

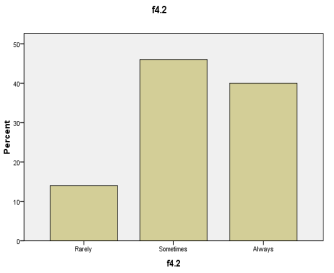


Figure 4.141 Chance of occurrence of social and behavioral related – seasonal employment

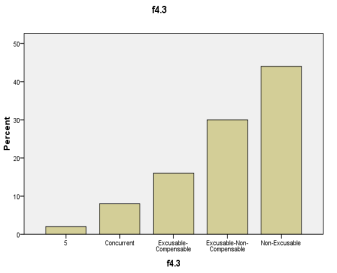


Figure 4.142 Type of delay of social and behavioral related - seasonal employment

4.3.6.5 verbal agreement between the contractor and subcontractor:

Figure 4.143 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 58%, followed by the shared 16%, followed by consultant 14 %, followed by government 10% then owner 2% .

And figure 4.144 below shows the result of analysis of chance of

occurrence this reasons of delay . Always has received the highest percentage of 48%, followed by the sometimes 42%, then rarely 10% .

Also figure 4.145 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 54%, followed by excusable-non-compensable 32%, followed by concurrent 10%, then excusable-compensable 4% .

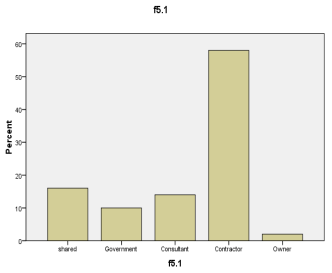


Figure 4.143 Responsibility of social and behavioral related – verbal agreement between the contractor and subcontractor

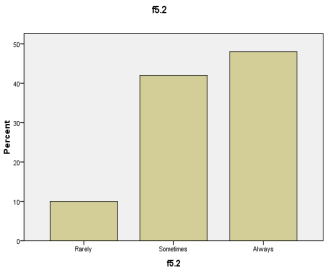


Figure 4.144 Chance of occurrence of social and behavioral related – verbal agreement between the contractor and subcontractor

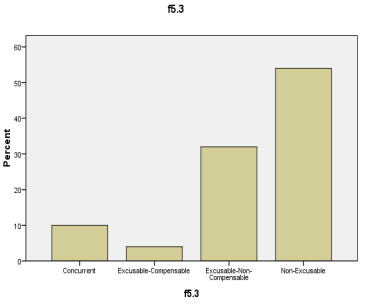


Figure 4.145 Type of delay of social and behavioral related - verbal agreement between the contractor and subcontractor

4.3.6.6 Multi-national firms:

Figure 4.146 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 34%, followed by the government 34%, followed by shared 14 %, followed by owner 10% then consultant 8% .

And figure 4.147 below shows the result of analysis of chance of occurrence this reasons of delay . Sometimes received the highest percentage of 40%, followed by the always 34%, then rarely 26% .

Also figure 4.148 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 40%, followed by excusable-non-compensable 38%, followed by concurrent 16%, then excusable-compensable 6% .

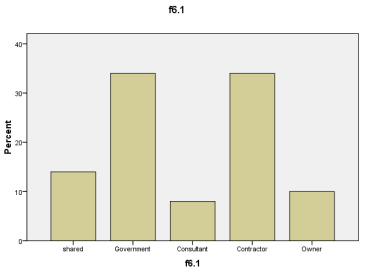


Figure 4.146 Responsibility of social and behavioral related - multi-national firms

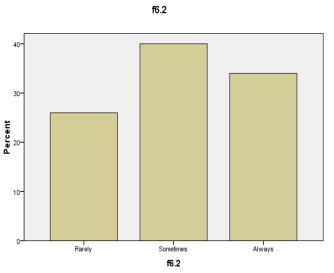


Figure 4.147 Chance of occurrence social and behavioral related - multi-national firms

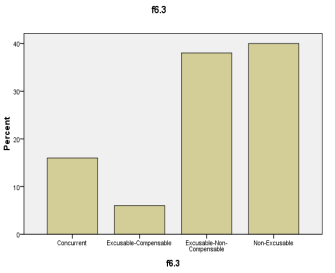


Figure 4.148 Type of delay of social and behavioral related - multi-national firms

4.3.6.6 Multi-national labor:

Figure 4.149 below shows the result of analysis of who is responsible of this reasons of delay . Contractor has received the highest percentage of 46%, followed by the government 22%, followed by shared 18 %, followed by consultant 12% then owner 2% .

And figure 4.150 below shows the result of analysis of chance of occurrence this reasons of delay . Always received the highest percentage of 36%, followed by the sometimes 34%, then rarely 30% .

Also Figure 4.151 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 46%, followed by excusable-non-compensable 36%, followed by concurrent 18%, then excusable-compensable 0% .

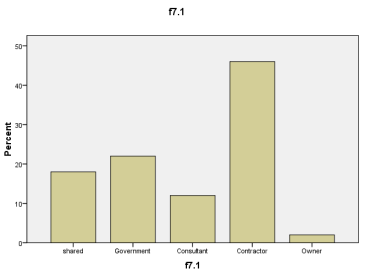


Figure 4.149 Responsibility of Social and behavioral related - multi-national labor

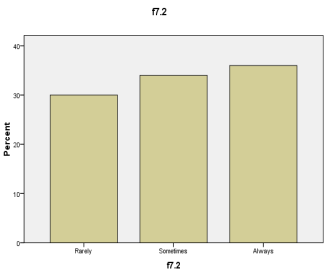


Figure 4.150 Chance of occurrence of Social and behavioral related – Multi-national labor

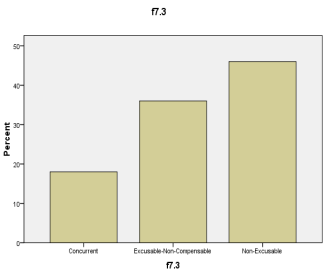


Figure 4.151 Type of delay of social and behavioral related - multi-national labor

4.3.6.7 Lack of productivity in the month of ramadan:

Figure 4.152 below shows the result of analysis of who is responsible of

this reasons of delay . Contractor has received the highest percentage of 64%, followed by the shared 16%, followed by government 10 %, followed by consultant 10% then owner 0% .

And figure 4.153 below shows the result of analysis of chance of occurrence this reasons of delay . Always received the highest percentage of 62%, followed by the sometimes 34%, then rarely 4% .

Also figure 4.154 below shows the result of analysis of the type of the delay of this reasons of delay . Non-excusable received the highest percentage of 44%, followed by excusable-non-compensable 36%, followed by excusable-compensable 14%, then concurrent 6% .

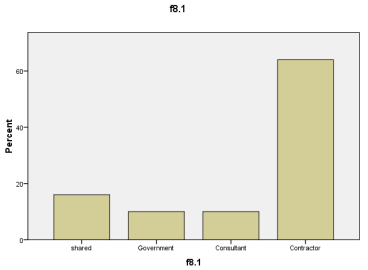


Figure 4.152 Responsibility of social and behavioral related - lack of productivity in the month of Ramadan

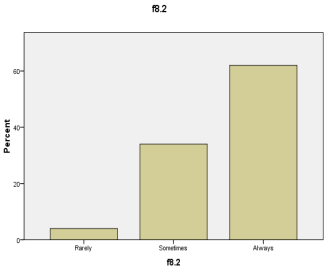


Figure 4.153 Chance of occurrence of social and behavioral related – lack of productivity in the month of Ramadan

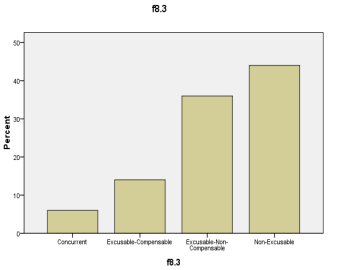


Figure 4.154 Type of delay of social and behavioral related - lack of productivity in the month of Ramadan

4.4 Identification of responsibility , chance of occurrence and the type of delay:

The identification of responsibilities as well as chance of occurrence and types of delays is shown in tables 4.1 through 4.3. The responsibility was rated among the parties that may be involved on a construction project starting from the owner, contractor, consultant, and government to shared (owner-contractor, consultant, etc). On the other hand the chance of occurrence rated among (always, sometimes , rarely) and the type of delay rated among(non-excusable, excusable-non-compensable, excusable-compensable, concurrent). And will be presented in the following tables:

The table 4.1 below shows who is responsible of each party for the delay factors:

factors	Contractor	Consultant	Owner	Governme	Shared

				nt	
1- financial related					
			1-Difficulties in financing project		
				2- Economic problems	
					3Financial difficulties
			4-Delay in progress payments		

Table 4.1 cont.:

factors	**Contractor**	**Consultant**	**Owner**	**Governme nt**	**Shared**
2- design related					
		1- Delays in producing design documents design			
		2-Unclear and inadequate details in drawings design			
		3-Complexity of project design			
		4-Misunderst in of owners requirements			
		5- Inadequate design-team experience			
		6- Un-use of advanced engineering design software			

			7- Change order		
3- Act of god					
	1-Wind damage				
	2- Rain effect on construction activities				
	3-Hot weather effect on construction activities				
	4- Fire				

Table 4.1 cont.:

factors	**Contractor**	**Consultant**	**Owner**	**Government**	**Shared**
4- management related					
					1- Conflicts between parties
	2- Poor communication &coordination on on site				
	3- Poor site management				
		4- Poor site supervision			
	5- Application of safety rules during construction				
		6- Delay in			

		performing final inspection and certification			
		7- Slowness in decision making			
	8- Rework due to errors during construction				
	9- Ineffective planning and scheduling of project				
	10- Improper construction methods implementd				

Table 4.1 cont.:

factors	**Contractor**	**Consultant**	**Owner**	**Government**	**Shared**
	11- Poor managerial skills				
				12- Changes in governmen t laws	
			13- Problem with neighbors		
5- Construc tion Related					
			1- Delay in obtaining permits for construction		
		2- Inspections			
	3- Delay in materials				

	delivery				
		4- Changes in material types and specifications during construction			
	5- Delay in manufacturing special building materials				
	6- Late procurement of materials				
		7- Late in selection of finishing materials due to availability of many types in market			
	8- Lack of qualified craftsmen				

Table 4.1 cont.

factors	**Contractor**	**Consultant**	**Owner**	**Government**	**Shared**
	9- Shortage of labors				
	10- Nationality of labors				
	11- Personal conflicts among labors				
	12- Poor subcontractor Performance				

	13- Construction mistakes				
	14- Equipment availability				
6- Social and behavior Related					
	1- Lack of trained craft workers				
	2- A large number of illiterate workers				
	3- unqualified foreman				
	4- Seasonal employment				

Table 4.1 cont.:

factors	**Contractor**	**Consultant**	**Owner**	**Government**	**Shared**
	5- verbal agreement between the contractor & subcontractor				
	6- Multi-national firms			6- Multi-national firms	
	7- Multi-national labor				
	8- Lack of productivity in the month of				

	Ramadan				

Table 4.2 shows the chance of occurrence of delay for each of the factors:

factors	Chance of Occurrence
1- financial related 2- design related 3- Act of god 4- management related 5- Construction Related 6- Social and behavioral Related	Sometimes

Table 4.3 shows the type of delay for each of the factors:

factors	Cont.
1- financial related	Non-Excusable Excusable-Non-Compensable
2- design related	Non-Excusable
3- Act of god	Excusable-Non-Compensable
4- management related	Non-Excusable
5- Construction Related	Non-Excusable
6- Social and behavioral Related	Non-Excusable

Chapter 5
Conclusions and recommendations
5.1 Conclusions:

This chapter provided and discussed the major findings obtained from the previous chapters; it proposes recommendations that could assist in future research studies, related to the causes of delay in building projects.
The delay is one of the most important problems facing the construction industry, in the world where it has become a global phenomenon, and Sudan is one of the countries that face this problem.
The main objective of the study was to identify the reasons for the delay in the state of Khartoum, through distribution of a questionnaire.
And the analysis with Statistical program (SPSS).

The majority of respondents were, workers in large-scale projects which prevail in Sudan, and expertise ranging between 10 and 15 years and that in the

public and private sectors and Consultant is the most target groups in the research.

Most participants agreed that the six factors listed in the questionnaire i.e. Financial, design, exceptional factors, management, construction and social and behavioral lead sometimes to occurrence of delay in the projects.

Most participants agreed that the owner is responsible for most of the delay caused by the financial factors and the type of delay, the delay here is non-excuse and sometimes can be Excusable-non-compensable.
The design factors was the adviser is responsible for them and always be a delay resulting from non-excusable.

Everyone agreed that contractor is responsible for a large number of factors and management factors, exceptional factors, construction factors and social and behavioral factors except for a small part of these factors responsibility was attributed to the rest of the parties and the majority of the delay caused by the type of delay is non-excusable.

5.2 Recommendations:-

5.2.1 Research Recommendations:-

Based on the study carried out by the researcher and the result of the analysis of the questionnaire and the findings of the researcher, the researcher recommended that; in order to reduce the delay in the implementation of construction projects and to avoid the occurrence researcher recommended the following recommendations and proposals:

1- To ensure the availability of adequate budgetary allocation for the project before announcing it.
2- To review contractor financial efficiency and its ability to implement the project before referring.
3-The financial problems should be avoided, by making the payments on time.
4- Provide amount of money reserve amounts for each project to cover expenses resulting from the price change and height.
5- Provide basic information about the project and liabilities of the owner before the preparation of the design so as not to change orders during the implementation phase.
6- Study duration sufficient to complete the project before the conclusion of the contract and the failure to adopt a short period or inadequate.
7- The use of modern technologies such as fax, computer, Internet and computer software for easy transfer of information and to get a good design as required.
8- To develop a realistic timetable according to scientific formulas depending on the productivity of labor or previous experience.

9- The site should be managed properly.
10- Avoid delay in reviewing and approving of design documents than the anticipate.
11- The subcontractors should complete their work on time and the suppliers should supply the materials on time.
12- The materials quality should be checked properly so that less errors and problems happen.
13- Prepare well thought out plans for the development and training of workers in the construction sector and constantly updated to keep pace with the development in the construction industry.
14- Expanding in establishing the training professional academies to provide the staff in the construction sector with scientific, theoretical, knowledgeable and professional experiences.
15- Raising the standard of awareness concerning the importance of time, its limitations, how to invest and decreasing the waste time to become general culture that motivates the working staff minds.

5.2.2 Recommendations of the coming studies:-
1-The researcher recommended action research where the Contractor is the biggest target in the questionnaire.
2-The researcher recommended action research where the owner is the biggest target in the questionnaire
3-The researcher recommended job search compared to the house of delays in projects in Sudan and other countries.
4-The researcher recommended action questionnaire in Arabic to facilitate the distribution and filling.

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Delays in construction projects

Questionnaire

Please take a look at the following questionnaire and try to answer correctly and accurately, as many questions as possible. All the information

gathered here will be kept strictly confidential and will be used only for research and analysis without mentioning the person or company names. Thank you very much for your cooperation.

Part(1) : General information:-

1- What is your business?

- Contractor

Consultant-

- Client/ Client representative.

2- What is the sector type you work for?

- Public

- Private

- Both

3- What is/are the size of project/s have you participated in?

- Very large

- Large

- Medium

? 4- How long have you been dealing with construction projects

Years5 - <

years-10 5-

years -10-15

years- > 15

Part(2) : Which of the following are most important delays associated with your ongoing project(s)? Please rate the Chance of Occurrence, Responsibility and Type of Delay by circling a suitable figure as indicated below:-

Scale of Chance of Occurrence: **A-** Always**, S-** Sometimes**, R-** Rarely**.**

Scale of Responsibilities: **Own=** Owner**, Cont=** Contractor**, Cons=** Consultant**, Gov=**Government**.**

Scale of Type of Delay: 1=Non-Excusable**, 2=**Excusable-Non-Compensable**,**

3= Excusable-Compensable**, 4**= Concurrent**.**

□ ***Delays Causes***	**Responsibility**	***Chance of Occurrence***	**Type of Delay**
	Own. Cont. Cons. Gov. Shared	A -s- R	1-2-3-4
1- financial related			
Difficulties in financing project			
Economic Problems			
Financial Difficulties			
Delay in progress payments			

2- design related			
Delays in producing design documents Design			
Unclear and inadequate details in drawings Design			
Complexity of project design			
Misunderstanding of owners requirements			
Inadequate design-team experience			
Un-use of advanced engineering design softw			
Change Order			

3- Act of god			
Wind Damage			
Rain effect on construction activities			
Hot weather effect on construction activities			
Fire			

4- management related			
Conflicts between parties			
Poor communication and coordination on site			
Poor site management			
Poor site supervision			
Application of safety rules during construction			
Delay in performing final inspection and certification			
Slowness in decision making			
Rework due to errors during construction			
Ineffective planning and scheduling of project			
Improper construction methods implemented			
Poor Managerial Skills			
Changes in government regulations and laws			
Problem with neighbors			

6- Social and behavioral Related :			
Lack of trained craft workers			
A large number of illiterate workers			
unqualified foreman			
Seasonal employment			
verbal agreement between the contractor and subcontractor			
Multi-national firms			
Multi-national labor			
Lack of productivity in the month of Ramadan			
availability of many types in market			
Lack of Qualified Craftsmen			
Shortage of labors			
Nationality of labors			
Personal conflicts among labors			
Poor Subcontractor Performance			
Construction Mistakes			
Equipment Availability			

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THANK YOU VERY MUCH