UNIVERSITI TEKNOLOGI MARA

DEPARTMENT OF BUILDING

FACULTY OF ARCHITECTURE , PLANNING AND SURVEYING

UNIVERSITI TEKNOLOGI MARA

(PERAK)

OCTOBER 2013

It is recommended that this Practical Training Report prepared

By

MUHAMMAD LUQMAN BIN MOHD ALI

2011219942

entitled

THE CONSTRUCTION OF DEBRIS FLOW BARRIERS

Accept as to fulfil part of the rule for getting diploma in building

Practical Training Reports	Dr. Sr. Hj. Hayroman Bin Ahmad
Practical Training Coordinator	Sr. Anas Zafirol B. Abdullah Halim
Faculty Coordinator	Dr. Mohd Rofdzi B Abdullah

DEPARTMENT OF BUILDING

FACULTY OF ARCHITECTURE , PLANNING AND SURVEYING

UNIVERSITI TEKNOLOGI MARA

(PERAK)

OCTOBER 2013

STUDENT'S DECLARATION

This is a result of practical training report writing work has been produced entirely by me except as expressed through practical training that I went through for 5 months start from 13 May 2013 to 28 September 2013 in this company. It also as one of the requirements to pass the course DBN307 and accepted in partial fulfilment of the requirements for a diploma Buildings

Name : MUHAMMAD LUQMAN BIN MOHD ALI

UITM ID No : 2011219942

Date : 30/9/2013

CONTENTS **PAGE**

Acknowledgment

ASSALAMUALAIKUM.

Bismillahirrahmanirrahim, first and foremost, we would like to thank the Almighty God, Allah S.W.T. all glory to Allah S.W.T for giving us the strength and the perseverance to do our best despite all the obstacles and hurdles for this practical training report.

Through this, we would like to take this opportunity to thank our project manager EN AINNUDIN BIN ABDULLAH because to give me a chances, reliance to do practical training under AHT NORLAND UNITED & CARRIAGE SDN.BHD.

And also i would like to thank a lot to our site engineer EN CHE MOND NUHAIRI BIN CHE JEMANI who had shown us so much kindness and given us lots of his advices, wisdom and ideas, sparing his time in guiding us throughout this practical training and also not forget to individual that involve this project. Thank you for giving me the chances.

Not forget to our supervisor DR HAYROMAN BIN AHMAD because give me guiding, ideas, advise to finish this practical training report with smoothly. Thank a lot.

Last but not least, appreciation goes to our beloved parents for supporting our practical training, brothers and sisters and all our friends who have given us so much moral support and encouragement to complete this practical training.

Thank you.

Acknowledgment

ASSALAMUALAIKUM.

Bismillahirrahmanirrahim, first and foremost, we would like to thank the Almighty God, Allah S.W.T. all glory to Allah S.W.T for giving us the strength and the perseverance to do our best despite all the obstacles and hurdles for this practical training report.

Through this, we would like to take this opportunity to thank our project manager EN AINNUDIN BIN ABDULLAH because to give me a chances, reliance to do practical training under AHT NORLAND UNITED & CARRIAGE SDN.BHD.

And also i would like to thank a lot to our site engineer EN CHE MOND NUHAIRI BIN CHE JEMANI who had shown us so much kindness and given us lots of his advices, wisdom and ideas, sparing his time in guiding us throughout this practical training and also not forget to individual that involve this project. Thank you for giving me the chances.

Not forget to our supervisor DR HAYROMAN BIN AHMAD because give me guiding, ideas, advise to finish this practical training report with smoothly. Thank a lot.

Last but not least, appreciation goes to our beloved parents for supporting our practical training, brothers and sisters and all our friends who have given us so much moral support and encouragement to complete this practical training.

Thank you.

Abstract

The construction of debris flow barriers, to give protection from rockfall, soil and so on and also this system is based on detailed investigations by specialized engineering firms, particularly taking into account the following geotechnical aspects to define the range of possible application is former debris flow events, catchment area (condition of soil, inclination ,size),estimated rainfall intensity. Interview is the best way how to obtain the true information about debris flow barriers. Interview is the process to getting information directly from our site engineer or site supervisor. At the end of this project I can identify the different between system UV and system VX, understand the method statement for each component of debris flow barriers. To identify the problems and how to solve it.

List Of Table

List Of Diagram

List Of Appendix

CHAPTER 1 : INTRODUCTION

1.0 Introduction

A debris flow barrier is our flexible ring net barriers withstand high static and dynamic loads. At Malaysia there have four site that used this the technology which is Bukit Freezer, Gua Musang, Gua Tempurung and New Castle at Kuala Terengganu that in the process to be built. The debris flow barriers have two system which is UX and VX system. They can be installed with a low outlay of material and man hours, greatly reducing costs and construction time. Emptying is simple.

A debris flow or mudslide barrier from Geobrugg at a glance is enormous reduction in construction time. Tested in field trials with the swiss federal research institute for forest, snow and landscape WSL . Cost-savings of 30 to 50% compared to concrete structures. Environment-friendly solutions, adapting visually into the landscape. Single-level barriers for events of up to 1000 m^3, multilevel barriers for events of several 1000 m^3

A component is thanks to the elastoplastic behaviour, ROCCO or ring nets themselves absorb energy, thereby reducing stress on the anchors. Brake rings in the support and border ropes are activated with major events, dissipating energies from the ring net without damaging the ropes. Thick-section angle steel protects the top support ropes from the abrasive effect of rubble and boulders. Spiral rope anchors or self-drilling anchor with Geobrugg FLEX head. For UX barriers we use posts type HEB that are mounted on a baseplate via a link.

Different between system UX and system VX

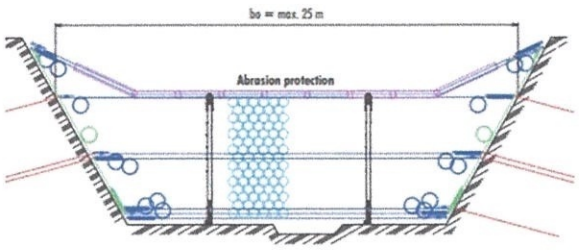
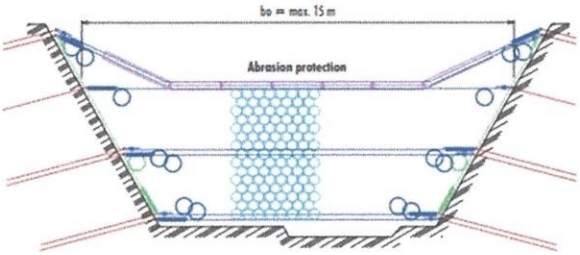
System UX	System VX
	
UX barrier for wider, U-shaped channels. This type of structure is suitable for span widths of up to approx. 25 m and an installation height of up to 6 m.	VX barrier for narrower V-cuttings. This type of structure is suitable for a span width of up to approx. 15 m and an installation height of up to 6 m.
There have two post that to support that barriers or ring net from collapse when occurring disaster.	Their are not have post as a support at the middle support rope.
Construction of the post fundaments.	There is not having construction of the post fundaments.
Fix the base plates on the fundaments by screwing.	Their no need to fix the base plates on the fundaments by screwing.
There are have installation of the light system	There are not have installation of the light system

Table1.1.0 The difference between system UV and VX

1.1 Research objective

1. To identify the different between system UV and system VX.
2. To understand the method statement for each component of debris flow barriers.
3. To identify the problems and how to solve it.

1.2 Research scope

To find the solution to solve this problem when this happen we must think to finish this project with quality. If we do not solve this problem it may be in future there have some problem when to do maintenance and so on. And also the scope of this research is involving the installation of debris flow barriers and their components on the site.

1.3 Research method

There are many ways to find the information about debris flow barriers some of the ways are:

Books

The first step in this research is to find the books that relate about this research. The books become the first because its content can be trusted and it was easy to get the books that related to our topic. The nearest and the only place that can assess wide range of books is library. Of course it is debris flow barriers it took a few days to searching and studying about the topic of debris flow barriers

Internet

Secondly internet as the internet has wide range of information that needed. Besides, using internet is faster, cheap and easy. However there was a problem when using a internet, some of the information provided is not true. There should make a comparison between the websites in order to make sure that to gain correct information. By the way we also confirm that the material we take is authorized to copyrights and it's was original content from the writer. By using internet also, we can find much information about the place of research.

Interview

Interview is the best way how to obtain the true information about debris flow barriers. Interview is the process to getting information directly from our site engineer **EN CHE MOHD NUHAIRI BIN CHE JEMANI** and **MR DAVE** as a site supervisor for debris flow barrier which give me a lot of information and also to our site supervisor and not forget to other people on that site which is give me a lot information and help me in my practicle training. The information is perfectly true because get direct without middle persons.

CHAPTER 2 : BACKGROUND OF COMPANY

2.0 Introduction

AHT (NORLAND UNITED) & CARRIAGE SDN. BHD. is a wholly owned bumiputera company incorporated in 1982. AHTNUCSB has since actively involved various construction diciplines and engineering supported with experience engineers and technical specialist with diversified engineering and management background.

AHTNUCSB has over the years undertaken and successfully completed project in various locations both for government and pated include those requiring fast-track and special expertise. AHTNUCSB main activities are building construction, mechanical and electrical and infrastructure work. The total value of project carried out to date is approximately RM 500 million.

AHTNUCSB's capabilities in the construction industries and with support from suppliers and financial institution, AHTNUCSB is commited to be one of the leading contractors in providing reliable services and products.

The Mission

- To provide clients with a reliable and high quality of services and products
- Provide clients with new approaches, creative ideas and innovative engineering solutions
- Ensure the company development into a multi-disciplinary construction is achieved with specialization and expertise to deliver all project as per schedule and achieve the pre-state quality
- Establish staff development through efficient, effectiveness and quality training

The Vision

- Building the company name to be one of the leading contractors worldwide diversified the company into multi-disciplinary construction building a mega structure which can be appreciated by generations to meet the national demand into moving toward the future.

2.1 Profile Of Company

Trade Name	AHT (NORLAND UNITED) & CARRIAGE SDN BHD
Date of incorporation	6th july,1982
Incorporation No	7514/82 (Tempatan 87269)
Authorised capital	RM 5,000,000.00
Board Of Directors	
Managing Directors	Dato'Haji Abdullah Bin Haji Taib
Directors	Shahriman Bin Dato'Haji Abdullah
Company secretary	Jehtro Management Service Sdn. Bhd.
Auditor	S.T. Tax And Advisory Services Sdn. Bhd. 202,2nd Floor, Jalan Batas Baru 20300 Kuala Terengganu, Terengganu Darul Iman.
Registered Address	202,2nd Floor, Jalan Batas Baru 20300 Kuala Terengganu, Terengganu Darul Iman.
Business Address Kuala Terengganu	No. 4, Tingkat satu Wisma Armon, Jalan Kamaruddin, Terengganu Darul Iman.
Tel and Fax	Tel : Fax : 6096221530
Business Address Kuala Lumpur	Blok B, Unit 4-8, Impian Kota, Jalan Kampung Attap, 50460 Kuala Lumpur.

Tel	
Company registration	Wholly Owned Bumiputera Company Registered with CIDB –G7 Registered with PKK under class 'A' Registered With Kementerian Kewangan Malaysia
Business Activities	1. Marine work 2. Building construction 3. Earthwork Specialist 4. Mechanical and electrical engineering 5. Interior design 6. Maintenance 7. Supply and services -(020101) Furniture (100101) Chemist Laboratory (190300) Marine Equipment (220202) Heavy Machinery/Vehicle/Machine (220207) Tug Boat/Ferry/Boat (221610) Construction Worker (221707) Licensing/Introduction to ISO Security Passes

Table 2.1.1 Profile Of Company

2.2 Organization Chart

1. Dato' Haji Abdulllah Bin Haji Taib
   Position: Managing Director
2. Shahriman Bin Dato'haji Abdullah
   Position: Director
   Qualification: B. Sc. Hon (Civ. Eng.) – Berkeley Int. Uni. California, US
3. Sr Shahril Bin Haji Awang @ Zainal Abidin
   Position: Project Director
   Qualification: Bsc (Hons) Q.S U.K Reg. Qs - MISM
4. Wan Khairuddin Bin Wan Noh
   Position: Excutive Hr Manager/Project Director
   Qualification: B Acc. Hon (Acc)-Berkeley Int Uni California, US
5. Johari Bin Ismail
   Position: Accountant
   Qualification: B Acc Hon (Acc) – UITM, Dungun, Terengganu
6. Azmi Bin Ahmad
   Position: Qmr/Asst. Project Manager/Cons. Manager Ii/Site Eng. II
   Qualification: B Sc. Eng. Hon (Civ Eng) – Universiti Teknologi Malaysia,Skudai
7. Mohd Khairuddin Bin Mohd Sidek
   Position: Commercial Manager/Asst Project Manager
   Qualification: B. Sc. Q/.S. - Usm
8. Ir. mohd Zamany Bin Hassan
   Position: Resident Engineer
   Qualification : B. Eng. (Hons) Civil – Universiti Of Malaya
9. Muhammad Yuswardy Bin Mohd Yusoff
   Position : Construction Manager I/ Site Engineer I
   Qualification : B. Sc. Eng. Hons (Civ. Eng) – Universiti Teknologi Malaysia
10. Mohamad Bin Osma
    Position: Construction Manager

Qualification: Adv. Dip. Electrical Eng - UITM

11. Mohd Amierul Shafiq Bin Mohd Zamre

    Position: Chargeman

    Qualification : SPM

12. Ab. Azih Bin Salleh

    Position : Safety Officer

    Qualification : Cert. Safety & Helth Officer – Registered With Dosh,Malaysia

13. Raja Islamil Bin Raja Jusoh

    Position : Asst Safety Officer

14. Arshad Bin Sharifuddin

    Position : Asst Safety Officer

15. Nur Hamizah Binti Hashim

    Position : Quantity Surveyor/Asst Project Manager

    Qualification : Bachelor Of Building Surveying (Hons) – Utim Shah Alam

16. Kamarul Ariffin Bin Samion

    Position : Quantity Surveyor

    Qualification : Dip In Q.S -UTM

17. Che Mohd Ezwan Bin Che Omar

    Position : Asst Quantity Surveyor

    Qualification : B. Sc In Q.S - UTM

18. Abd. Rahim Bin Tamb

    Position : Design Coordinator

    Qualification : Cert Of Design & Arch Drafting – Mara Pahang

19. Mazlan Bin Jusoh

    Position : Site Architect

    Qualification : Dip In Arch – UTM,Skudai

20. Aidah Binti Abd. Ghani

    Position : Account Executive

21. Hayati Binti Omar

    Position : Executive Hr

    Qualification : Dip In Buss Studies – UITM

22. Azrina Binti Shamsuddin

    Position : Document Executive

    Qualification : Dip In Civ Stuc Eng POLISAS

23. Mohd Ikhtisyamuddin Bin Abd. Rashid

    Position : Drawing Executive

    Qualification : Dip Technology Of Arch - KKTM

24. Mazlina Binti Mat

    Position : Asst Account Executive

25. Nur Ayunni Binti Dzul Karnain

    Position : Asst Executive HR

    Qualification : Degree In Finance – Uitm Shah Alam

26. Ismadi Bin Razaly

    Position : Officer

27. Jalil Bin Hassan

    Position : Site Supervisor I

28. Annas Bin Abdullah

    Position : Site Supervisor II

    Qualification : Dip Teknologi Binaan - ILP

29. Khairul Kana Bin Abdullah

    Position : Site Supervisor III

    Qualification : Dip In Mech Eng – POLI Kuching

30. Ahmad Izzudin Bin Abd. Razak

    Position : Site Engineer

    Qualification : B Sc Hon (Cicil Eng) – UMP

31. Napisah Binti Mat Amin

    Position : Admistration Clerk

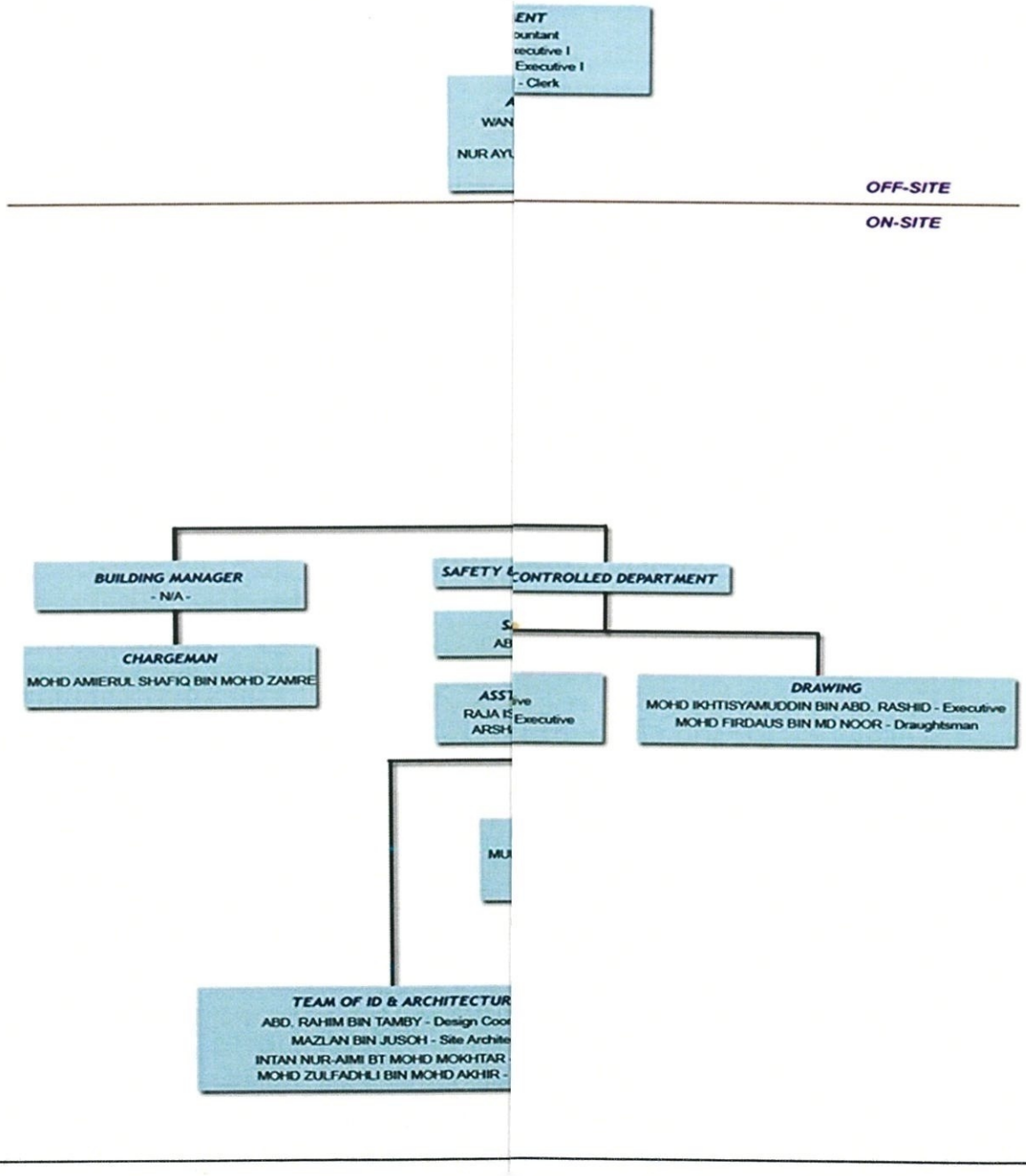
32. Zaliza Binti Johari

    Position : Admistration Clerk – Branch In KL

    Qualification : Dip In Nursing – Malaysia Aliend Health Science Academy

33. Nik Haizan Binti Nik Soh

    Position : Account Clerk


ENT
ountant
ecutive I
Executive I
- Clerk
WAN
NUR AY
OFF-SITE
ON-SITE
BUILDING MANAGER
- N/A -
CHARGEMAN
MOHD AMIERUL SHAFIQ BIN MOHD ZAMRE
SAFETY &
CONTROLLED DEPARTMENT
AB
ASST
ive
RAJA IS
ARSH
Executive
DRAWING
MOHD IKHTISYAMUDDIN BIN ABD. RASHID - Executive
MOHD FIRDAUS BIN MD NOOR - Draughtsman
MU
TEAM OF ID & ARCHITECTUR
ABD. RAHIM BIN TAMBY - Design Coo
MAZLAN BIN JUSOH - Site Archite
INTAN NUR-AIMI BT MOHD MOKHTAR
MOHD ZULFADHLI BIN MOHD AKHIR -

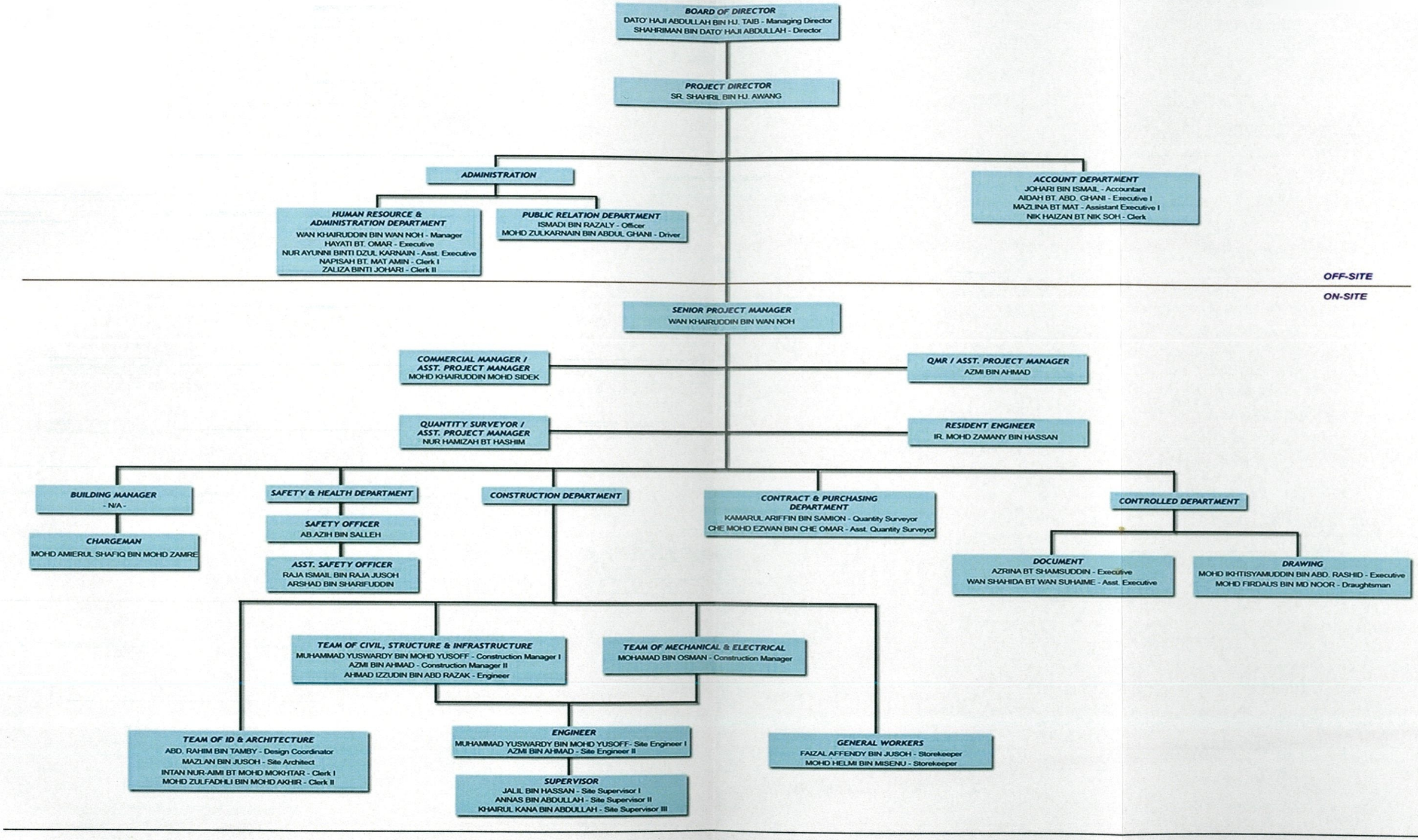


DIAGRAM 2.2.1 The organization chart

2.3 List Of Project

Table 2.3.1 Finished projects.

PROJECT DESCRIPTION	CLIENT	DATE OF COMMENCING/ COMPLETION
To proposed Low Cost Terrace House on lot 8210,8211 & 8212,Mukim Kuala Nerus,Kuala Terengganu.(214 Units)	TAMAN UDA – MURNI SDN. BHD	20.09.1990
To proposed Low Cost Terrace House on lot 7678 & 7679,Mukim Kuala Nerus,Kuala Terengganu.(139 Units)		02.06.1991
To Proposed the Construction and Housing Project Advancing Customs On Lot 2273 – 2289,Mukim Kubang Parit,Daerah Kuala Terengganu (Abandoned Project Takeover)	KASTAM DAN EKSAIS DIRAJA MALAYSIA	30.06.1993
To proposed 12 Units Shop 2 ½ storey at Kuala Berang,Hulu Terengganu,Terengganu Darul Iman.	MAJLIS DAERAH HULU TERENGGANU	
To proposed the Construction and Completion of 48 units 1 ½ storey Terrace House On Lot PT 5726 – PT 5733,Mukim Kuala Paka,Dungun,Terengganu	NORLAND UNITED	

To proposed Double Storey Homes On Lot PT 270P – 272P,Lot 1905 – 1925,Mukim Kuala Ibai,Kuala Terengganu.		15.07.1994
To proposed the Construction and Completion of Unit 192 Related Works With it PAKR Projects,Pekan Ajil,Tangg,Hulu Terengganu,Terengganu	JABATAN PERUMAH NEGARA	15.07.1995
Housing turnover police, multipurpose hall, surau, kindergarten, Perkep House And A Administration Building And Its components at Dungun,Terengganu	KEMENTERIAN	18.11.1999 – 30.06.2002
Special Projects to Maintenance of School – package PBF 1/PF08 Daerah Bera/Temerloh. (9 of school)	JKR FELDA PAHANG	20.09.1994 – 31.07.1996
To proposed Work Sites and Infrastructure And Related Works With it SPKA Projects And PAKR,Sungai Tong Dan Batu Rakit,Kuala Terengganu.	GABUNGAN PEMBORONG QUARRY SDN. BHD	30.05.1994 – 30.04.1996
To Proposal to be Build semi Houses – D2 storey and 1 ½ Terrace House storey,Mukim Kuala Ibai Dan Kuala Paka,Terengganu	PRIVATE OWNER	01.01.1994 – 30.07.1997
To construct and Install Artificial reefs Lobster at Perairan Pulau Redang,Terengganu Darul Iman	JABATAN PERIKANAN MALAYSIA	25.11.1991 – 17.05.1992

Table 2.3.2 The current projects.

PROJECT DESCRIPTION	CLIENT	DATE OF COMMENCING/ COMPLETION
To proposed complexs istana baru terengganu at bukit chendering, kuala terengganu	JKR TERENGGANU	July 2007 - June 2010
To proposed international endurance park at lembah bidong,merang,setiu,kuala terengganu (phase 2)	SERADA REALITY SDN.BHD	February 2006 – January 2008

CHAPTER 3 : CASE STUDY

3.0 Introduction

The design of debris flow barriers is one of the method come from Switzerland to give protection system is based on detailed investigations by specialized engineering firms, particularly taking into account the following geotechnical aspects to define the range of possible application is former debris flow events, catchment area (condition of soil, inclination ,size), estimated rainfall intensity, debris flow input parameter (volume of decisive surge and total volume, density, middle front velocity), composition of debris flow (debris fraction, water content, density), probability of occurrence, calculation of decisive load cases, barrier location (consideration of local topography), anchorage conditions.

The functional efficiency of the system is base on one-to-one field test at the illegrabe test site. The tested barriers could retain a volume of 750 m^3 in 2005 and 1000 m^3 in 2006 and were overtopped with several debris flows with more than 10.000 m^3 of material. Important input parameters could be measured like debris flow velocity, density, flow height and impact forces and helped to develop a full design concept.

The quality of the system components is geobrugg AG, the former geobrugg protection system division of fatzer AG, ramanshorn has been certificate since august 22nd 1995 under the registration no. 34372 in accordance with the quality management system requirement (ISO 9001,2008,revised 2010). The certifying body is the swiss association for quality and management system (SQS), which belongs to EQ-Net 9000. The quality manual completely specifies how to test the system components (raw material, commercial and end products) comprehensively in order to exclude deficiencies in quality. The relevant certificates are attached as appendices.

The quality of control for installation for this product manual describes in detail the different steps for installation of the barriers. These steps must be faithfully followed by local building contractors.

Product liability rockfall, landslides, debris flows or avalanches are sporadic and unpredictable. Cause can be e.g. human (construction, etc.) or environmental (weather, earthquakes, etc.). Due to the multiplicity of factors affecting such events it is not and cannot be an exact science that guarantees the safety of individuals and property.

However, by the application of sound engineering principles to range of parameters and by the implementation of correctly designed protection measures in identified risk areas the risk of injury and loss of property can be reduced substantially.

Inspection and maintenance of such systems are an absolute requirement to ensure the desired protection level. The system safety can also be impaired by events such as natural disasters, inadequate dimensioning parameters or failure to use the prescribed standard components, system and original parts; and or corrosion (caused by pollution of the environment or other man-made factors as well as other external influences).

Because of individual sections of debris flow torrents various barriers design and setups are possible. The influence of such adaptations cannot be concretized every time. Critical input parameters are for example span width the barriers, barriers height, river bed inclination, debris flow volume, flow height and possibility of anchorages.

Geobrugg can assist with estimating the influences of large deviations and special situations, and can offer recommendations for feasible solution. Geobrugg cannot, however, guarantee

the same behavior as in the one-to-one debris flow barrier test. In critical cases,it is advisable to reinforce particular components as compared with the standard barrier.

The system drawing of the rope guiding UX system. The end of the ropes with pressed loops is fixed with shackles at the flexible head of the anchors. On the other side the ropes will be spanned and fixed with wire rope clips. In the same way also the winglet rope is installed. With shackles it is additional fixed to the upper support rope. The border rope is fixed to the flexible head of the winglet rope and will be guided through every flexible head down, to the lowest anchorage of the bottom rope and will be fixed with wire rope clips.

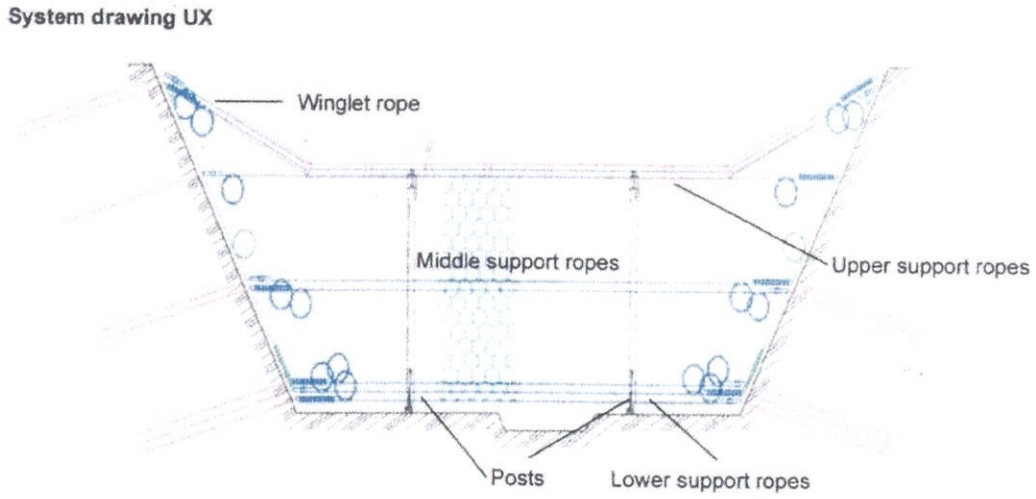


DIAGRAM 3.1.1 System drawing UX

An anchor force is the forces caused by a debris flow can be very high. Therefore the underground engineering and installation work have to be done precise and accurate. The length of the anchors is based to the measured rope forces of the 1:1 field tests and depending on the quality and soil bearing capacity. The anchor length has to be determined by a regional involved geologist.

3.1 Background Of Project

Proposed project new Castle Complex Terengganu, District Cendering, Kuala Terengganu is intended to build a new palace complex which is equipped with facilities for majesty majesty the sultan of Terengganu. It encompasses the design, construction and completion of new castle complex involving buildings, ceremonial palace, residence palace, block administration prayer palace, block support, residential officer, block utility, landscape, guest palace and so on.

The site of new Castle Complex Terengganu is located on the lot of pt 3010 in the mukim cendering, district of Kuala Terengganu, Terengganu, which is 8 km from the city of Kuala Terengganu. This site is adjacent to the main of cendering park and kubang ikan primary school. This palace can be accessed through the state road network, which is state road t100 that diverge from chendering to bukit payong through pengadang buloh.

The original site area is 50.32 acres of hilly land cover and slope hilly range as a saddle shape that provides a challenging area for the development of the castle. For future planning and development of the overall integrity of 52.49 acres of land attached to the original acreage. While 2.96 acres earmarked for primary access. Therefore, the entire new Castle Terengganu development site is 105.77 acres. Even so, the entire new Castle Complex Terengganu component only involves an area of 7.97 acres and the rest kept its natural state.

Overall, the new Castle Complex In Kuala Terengganu is built at an altitude of 5.0 meters above sea level, while the palace main residence for Duli Yang Maha Mulia Tuanku Al-Sultan Negeri Terengganu positioned to 90.0 meters above sea level. This unique position gives its charm by offering vista views towards the south china sea and city of Kuala Terengganu and new city of cendering.

The Main Component Of Project

The main components of the 13 buildings are as follows:

No	Buildings
1.	Ceremonial Building
2.	Bridge
3.	King's Personal Residence
4.	Family and Music Pavillion
5.	Guest Villa : Entertainment Pavillion
6.	Guest Villa : Bedroom Pavillion 1
7.	Guest Villa : Bedroom Pavillion 2
8.	Guest Villa : Bedroom Pavillion 3
9.	Guest Villa : Pray Room Pavillion
10.	Surau
11.	Guard House
12.	Administration Office
13.	Guest Palace
14.	Mosque (Balai Islam)

Table 3.1.0 Main components of the 13 buildings

Scope Of Work

The proposed scope of work is as follows

Building working:

1. Ceremonial Building
2. King Residence
3. Guest palace
4. Administration Office
5. Surau
6. Guard House
7. Bridge to mosque
8. Entertainment Pavillion-guest
9. Bedroom Pavillion-guest
10. Prayroom Pavillion-guest
11. Bathroom Pavillion-guest
12. Family and Music Pavillion
13. Religion Centre (Balai Islam)

Woking outside:

1. Site preparation and earthworks
2. Roadwork
3. Surface water drainage
4. Water reticulation works
5. Parking and footpath
6. Retaining structure
7. Sewerage reticulation system
8. Substation & suction tanks
9. Fencing and gate
10. Flag poles
11. Sewerage treatment plant
12. Soft and hard scaping works
13. Helipad

Working under the transitional provisions:

1. Internal signage
2. Chandeliers
3. Facade lightings
4. Loose carpets
5. Sauna accessories

Interior design work for all buildings:

1. Ceremonial Building
2. King Residence
3. Guest palace
4. Administration Office
5. Surau
6. Guard House
7. Bridge to mosque
8. Entertainment Pavillion-guest
9. Bedroom Pavillion-guest
10. Prayroom Pavillion-guest
11. Bathroom Pavillion-guest
12. Family and Music Pavillion
13. Religion Centre (Balai Islam)

Internal mechanical and electrical work:

1. Electrical installation
2. Telecommunication and IT system
3. PA, card access, CCTV, conference, SMATV, audio visual and sound system
4. Air conditioning & mechanical ventilation system
5. Fire protection
6. Internal plumbing
7. Lift & escalator
8. Kitchen equipment
9. Swimming pool and fountain

3.2 Case Study

3.2.1 The debris flow barriers system consists of the following components

No	Diagram	Description
1	 Net made of ROCCO – Rings	The ROCCO ring net is the main element of the system and consists of high-tensile wire with a tensile strenght of 1770 N/mm² and a diameter of 3mm. Ring nets with 12 windings are built into the lower intensity standart systems. Because of its design, the net itself can absorb energy through plastic deformation. The ROCCO ring net can be easily adapted to the terrain and is resistance against multiple impacts.
2	 Support and retaining ropes	The job of the support ropes is to transmit the forces occurring in the net over the posts to the anchors. Rope construction according to DIN 3060 / 3064. The ropes are available in galvanized or GEOBRUGG SUPERCOATING quality.
3	 Abrasion protection	The abrasion protection protects the upper support ropes from abrasion if the barrier is completely filled and gets overtopped. It consists of steel angles with welded shackles to fix it on the upper ropes. With shackles the profile can be linked together and can so deform flexible.

4	 Spiral rope anchor	The support and retaining ropes are anchored in the soil or reck by means of geobrugg apiral rope anchors. Alternative self drilling anchors are equipped with a flexible head, which ensures that forces not working directly in the pulling direction can also be transmitted. Two galvanized tubes over the anchor head, plus the galvanized spiral rope, provide double corrosion protection.
5	 Brake rings	The task of the built-in geobrugg brake elements (brake rings) is to dissipate energy via plastic deformation and friction, and to protect the support ropes from overload. The steel tubes also protect the rope from corrosion and mechanical
6	 Base plate	The base plates are the base for the posts and are either set on a concrete foundation. The concrete foundation is fixed with tension and pressure anchors in the ground of the torrent. The post is hinged on the plates. All elements that come in contact eighth the ropes are finishes without sharp edges to avoid rope damage.

7	 Hinged posts	The posts have the function to keep the system height after filling the barrier. HEB type steel posts are used and are mounted on baseplate. The rope guides at the posts head are finished without sharp edges to protect the ropes. The post is help of retaining ropes. The order in which the ropes are arranged on the post head corresponds to the installation sequence.
8	 Shackles	The connections between the ring net and the ropes are made with shackles. They guarantee that the net can slide on the rope without damaging it. The nets are also connected vertically with shackles. In general, the shackles are designed to produce the stronger connection than the net itself. The shackles can be bonded with adhesive (e.g., with Loctite) if they are requires to be theft-proof.
9	 Wire rope clips	The ropes are delivered with pressed loops on one side of the rope. The free end has to be fixed with wire rope clips. It is very important to use the right number of wire rope clips with the required torque values. The wire rope clips can be bonded with adhesive (e.g., with Loctite) if they are required to be theft-proof.

Table 3.2.1 Component of debris flow barriers

3.2.2 Anchorage

Marking of the anchorage location

The position of the debris flow barrier has to be fixed by the design engineer. Beneficial are smaller torrent sections with stable slopes to anchor the barrier. The maximum span width should not be larger than 25 m and the height of the barrier should not be more than 6 m. The basal opening between the lower support ropes and the river bed should be specified by an expert according to the expected flow height of the debris flow. The range of the basal opening normally lies between 0.5 and 1m.

DIAGRAM 3.2.2.1 Anchorage location

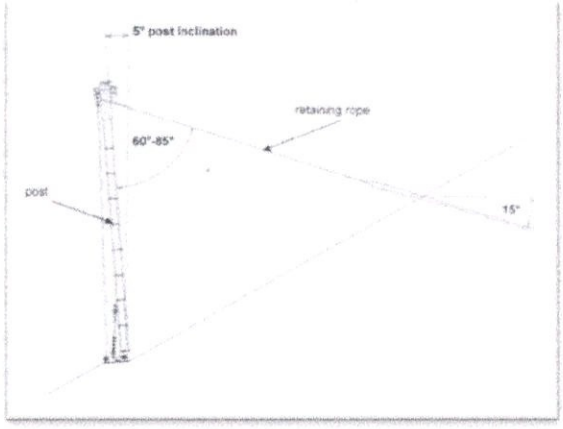
Anchorage points for the support ropes

The angle between the winglet rope and the upper support ropes should be between 20-25°. This geometric effect of the winglet ropes builds an overflow section section. The overflow section must be smaller than the span width of the river bed, so the erosion effect of the river banks can be minimized. The anchors of the upper and lower support ropes should be determined that the target height of the barrier is full filled. The middle support ropes are fixed in the middle of the section shown into he drawings. The barrier line is normally orthogonal to the flow direction. The barrier should be sloped forward in vertical direction max. 5°. The anchorage points have to be determined by marked points with spray paints.

DIAGRAM 3.2.2.2 Points for the support ropes

Anchorage points for the retaining ropes

The anchors of the retaining ropes have to be fixed behind the posts with an angle between 20-40° side wards of the horizontal line. The posts should be inclined max. 5°. The angle between the retaining ropes wards of the horizontal line. The posts should be 60-85° in all cases. There have 4 retaining ropes for each side.



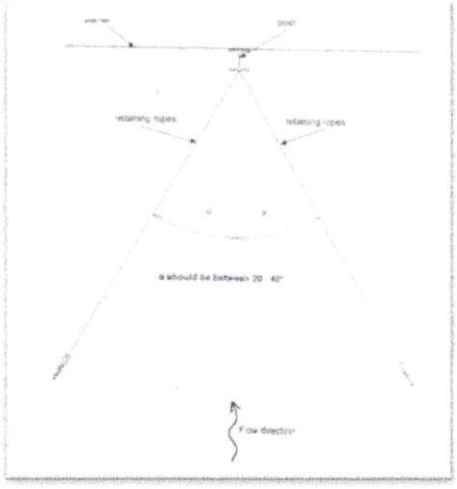


DIAGRAM 3.2.2.3 Position of the anchors for the retaining ropes

Anchorage of the post foundation

The reinforced post foundation transfers the horizontal and vertical load from the foundation over the anchorage to the ground. The post foundation is anchored with one compression anchor and two tension anchors. The compression anchor has to be drilled in vertical direction and the two tension anchors have to be built in 45° to horizontal direction and 10° inclined to the flow direction. To have the optimum load transfer you have to put quadratic steel plates at the end of the anchors and shorter bars built in vertical direction. The base plate has to be installed to these bars having the elongated holes valley site.

Installation steps:

1. Dig out the foundation hole and size of post foundation is 1 m×1 m×1 m.
2. Drill the anchorage in 6 meters and each rod is 1.5 meters length.
3. Shutter the foundation and build in the reinforcement. Put on the anchor plates.
4. Build in the two bars for the base plate (use the base plate as a face mould).
5. Concrete the foundation. Please round the foundation edges if the border rope is led along the foundation.
6. The fastening of nuts may not be tightened until the concrete has cured completely.

DIAGRAM 3.2.2.4 Post foundation

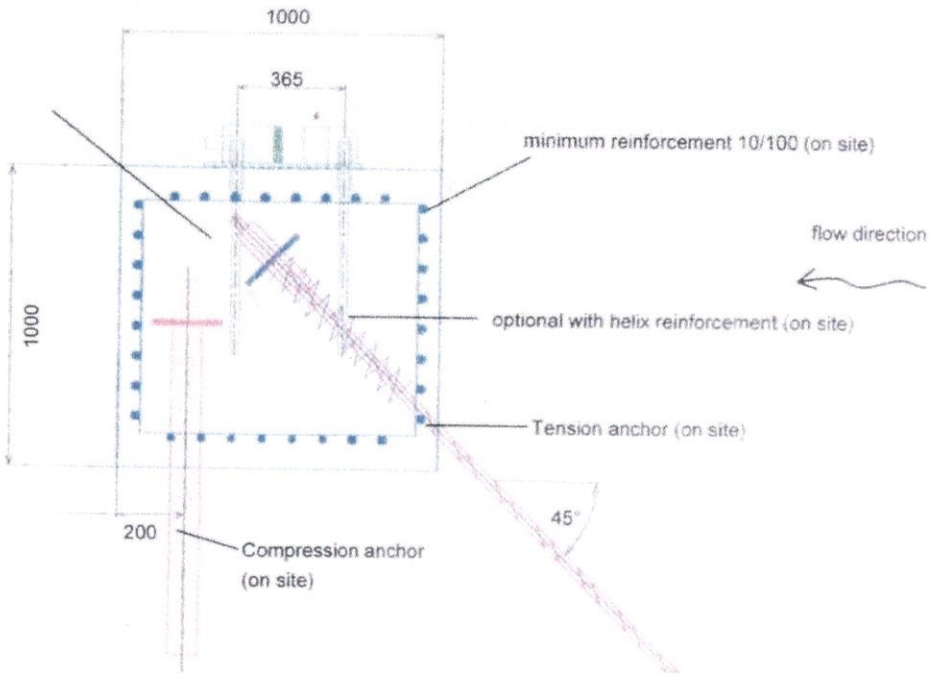


DIAGRAM 3.2.2.5 Sectional view post foundation

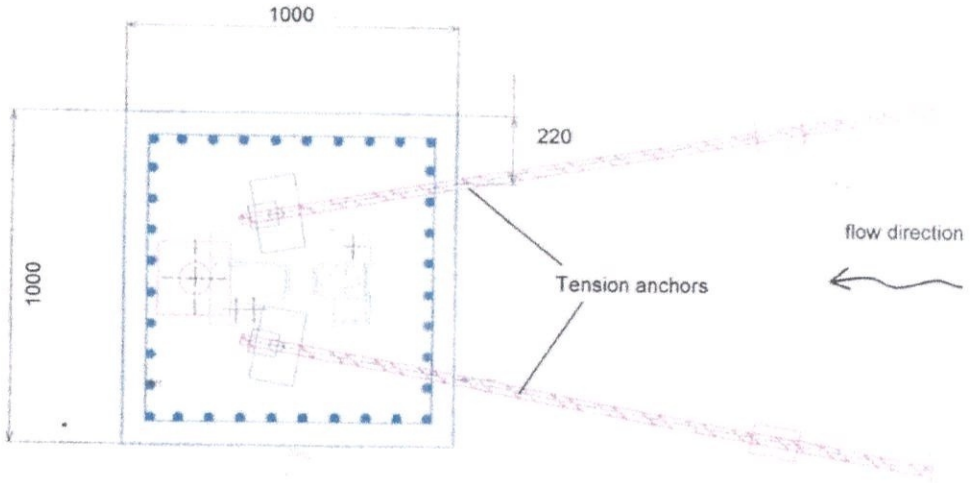


DIAGRAM 3.2.2.6 Plan view post foundation

Anchorage of the support and retaining ropes

The anchors of the support ropes have to be drilled in direction of the support ropes. If several anchors are needed for several ropes at one point, please incline one anchor 15° backwards to the flow direction and arrange it a little bit lower than the first one. The flexible anchor heads must lie as closed as possible to the ground surface to avoid a too large distance between the border rope and the slope. The flexible anchor heads make sure that loads not acting in the anchor line can be transmitted. So after an event only the superstructure has to be re-build and repaired.

Installation steps:

1. Dig the foundations.
2. Drill the anchors ropes in 8 meters length.
3. Put the flexible heads on the anchors if self drilling anchors are used. Shutter and reinforce the foundation. The flexible heads have to be build in up to the red marking. The edge of the concrete foundation has to be rounded because of the border ropes.
4. The holes of the shutter around the flexible heads have to be stuffed with polyethylene foam.
5. Concrete the foundation.

DIAGRAM 3.2.2.7 Anchorage of the support and retaining ropes

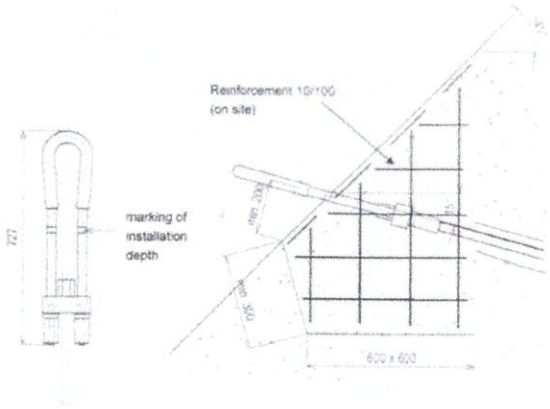


DIAGRAM 3.2.2.8 Sectional view support and retaining ropes

Arrangement of flexible heads

The loading of the anchors is not in its line direction after an event. They get deformed in vertical and horizontal direction. This means that the anchors have to be installed in this manner that they can deform in these directions. The best way is to incline the flexible heads 45° forward so also the border ropes are installed easily. Correct inclined flexible heads. The inclination should be circa 45°

DIAGRAM 3.2.2.9 Arrangement of flexible heads

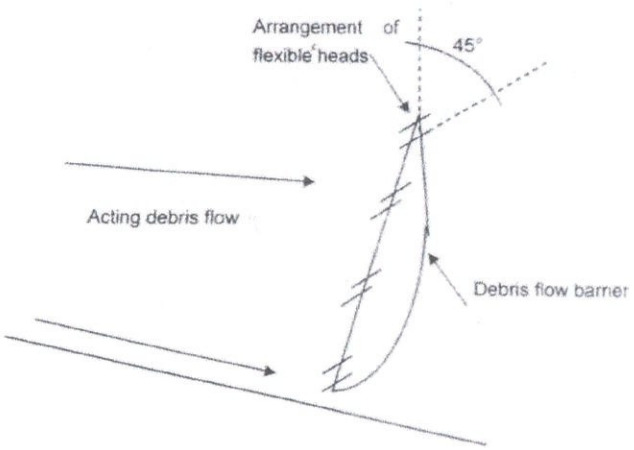


DIAGRAM 3.2.2.10 Illustrate arrangement flexible heads

3.2.3 Superstructure

Installation of the posts, support and retaining ropes

Installation steps:

1. Outlay and control the length of retaining and support ropes.
2. Pull the brake rings to the correct position. The brake rings can be fixed with a small wood wedge. The position of the brake rings should be closed to the anchors next to the slope. So the brake rings can deform easily.

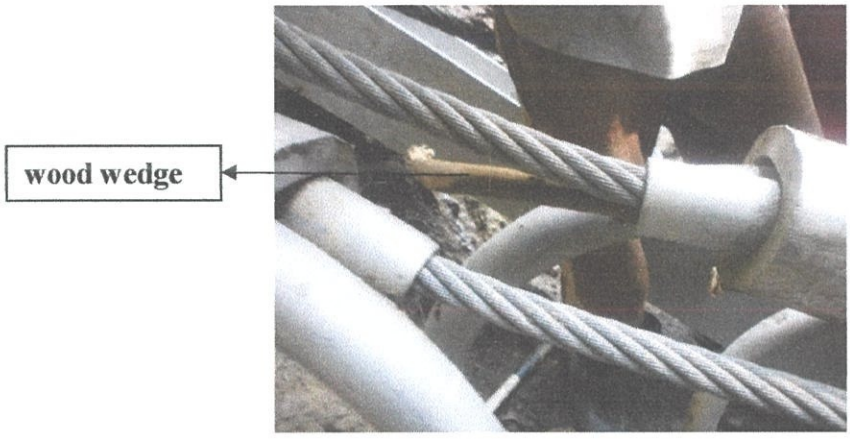


DIAGRAM 3.2.3.0 Fixed with a small wood wedge

3. *Fix and lift the upper support* ropes. Please do not tension the ropes yet because the post still has to be installed. The brake rings should be closed to the anchors next to the slope. If several support ropes are installed, hold them together next to anchors.

DIAGRAM 3.2.3.1 Upper support ropes

4. The posts have to be installed with chain hoist and have to be fixed at the base plate. The eyelet for the overturn securing rope has to be on valley site use base on theory but for this site their not used overturn securing because their used chain hoist as a replace the overturn securing rope. Put the joist on the foot of the post onto the supporting block. Push the hinge tube through the joint, and secure with two large spring cotters. Afterwards as follow the theory their uses the posts are leaned against the upper support rope but on site their not used because their replace with chain hoist.

DIAGRAM 3.2.3.2 Overturn securing rope

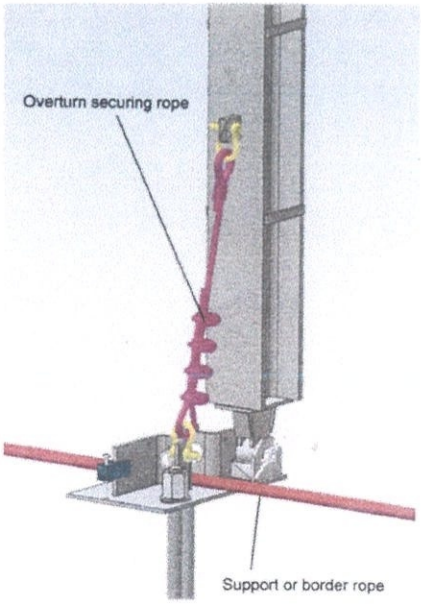


DIAGRAM 3.2.3.3 Illustrate overturn securing ropes

5. Fix the overturning securing rope at the base plate. Please pay attention that the overtuning securing rope is long enough to put the posts in the right position.

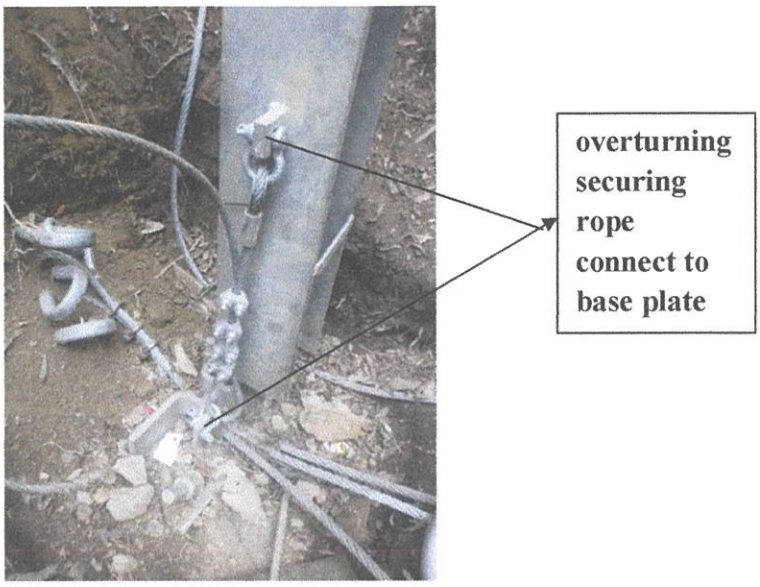


DIAGRAM 3.2.3.4 Fix the overturning securing rope at the base plate

6. The retaining ropes are held with a securing rod, which is secured with a small spring cotter. The brake rings should be 1 meter away from the post.

DIAGRAM 3.2.3.5 Brake rings should be 1 meter away from the post

7. Tension the retaining ropes and pull the posts in the right position.
8. Lead the upper support ropes through the head of the post and tension them. If several support ropes exist hold them together with a shackle as closed as possible to the anchors.
9. Align the post in the right position. The post should be inclined 5° in flow direction and 1-2° to the slope site. In no way incline the post to the river bed site.
10. Tension the retaining ropes together so that they are prestressed in the same way.
11. Thread the border ropes through the flexible heads and tension them. The pressed loops should not lie on the concrete foundation. Please have a look at the correct number of brake rings and install them in the middle between the anchors of upper and middle and lower ropes.
12. Tension the lower ropes. If several support ropes exist hold them together with a shackle as possible to the anchors.
13. **Please tension the middle support ropes after the ring net installation. Very important, the middle support ropes have to be installed at the valley site of the ring net.**

Installation of the ring net

1. Maybe an auxiliary rope or a tension belt is necessary to install the ring net more easily.
2. The net is easily installed by additional bars led through the second ring range. The bars are fixed together with the net to the upper support ropes with a chain hoist. Afterwards the final first range of rings (normally marked blue) should be connected to the upper support ropes with shackles. Alternatively a staging as a temporary support to install the ring net can be used and led through the second ring range and can be pulled with a chain hoist up to the upper support ropes.

DIAGRAM 3.2.3.6 Alternatively a staging as a temporary support

3. Remove the bar and disperse the ring net with the help of a chain hoist. Please pay attention, the rings should not deform. The best way is to start with the middle part of ring net and continue with the lateral parts. Please do not cut the ring net before it is shackled to every ropes.
4. The nets have to be connected with 3/4″ shackles in the following way that very ring is connected with 4 neighbor rings. Except of the border rings next to the support and border ropes, they have only 3 neighbor rings. Or in other words the rings of each particular main ring line have to be connected to one line.

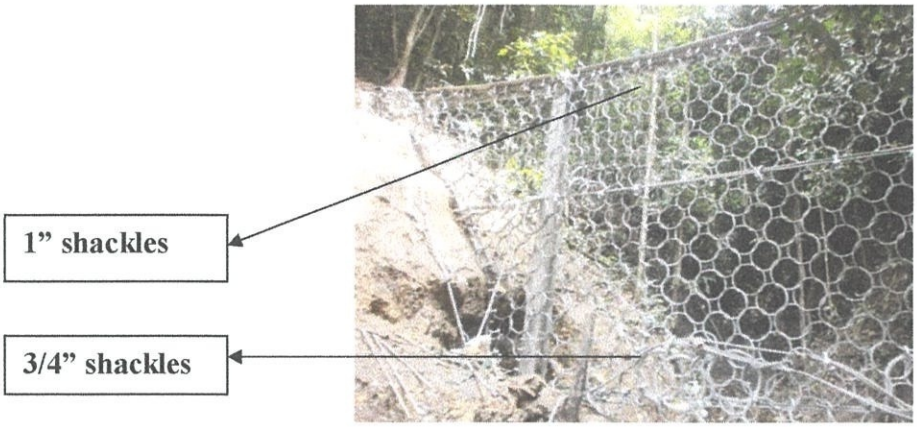


DIAGRAM 3.2.3.7 Nets have to be connected with shackles

5. After the connection of the ring nets together they should be connected with the lower support and the border ropes. Therefore 1" shackles should be used. And then there are have two types or size of shackles which is 1" shackles and 3/4" shackles.
6. The brake rings of the lower support ropes should be fixed flow upwards with wire to the rings net thus debris cannot block the brake rings with stones.

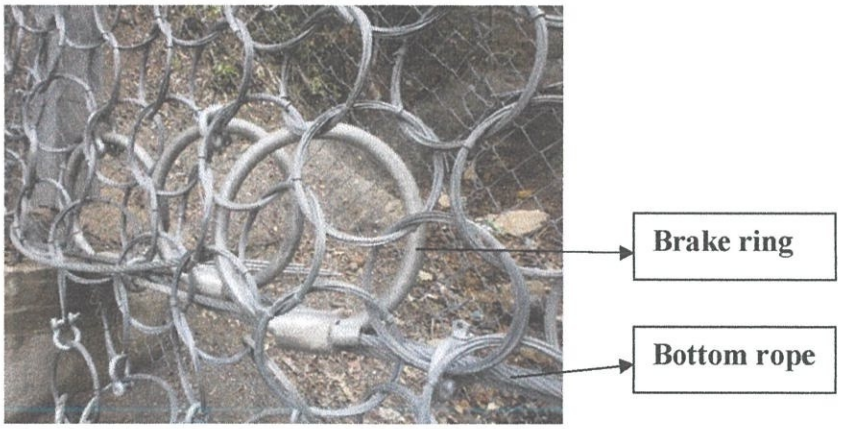


DIAGRAM 3.2.3.8 Brake rings of the lower support ropes

7. Tension the middle ropes and connect them with the ring net with 1″ shackles.

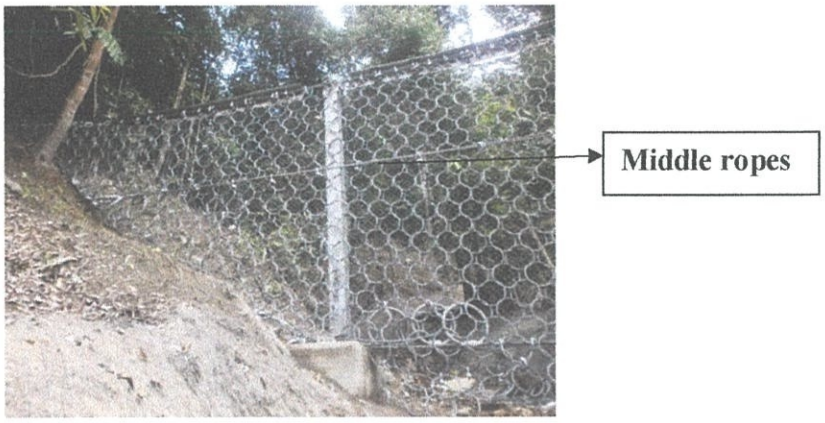


DIAGRAM 3.2.3.9 Middle ropes

Installation of the abrasion protection

1. The best way to elevate the single abrasion profile is by an chain hoist. The abrasion profile can installed directly to the upper and winglet (if it exists) support ropes by the welded shackles.

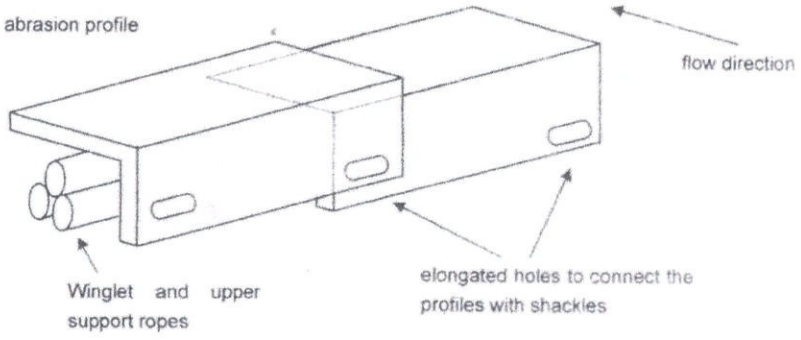


DIAGRAM 3.2.3.10 Abrasion protection

2. The single profile should overlap each other. Afterwards they are connected with 3/4″ shackles through the elongated holes. The overlap area should be as large as possible to allow in case of elongation of the brake rings enough way for the abrasion profile to elongate too. Additionally the abrasion protection is fixed with 3/4″ shackles to the secondary ring range to avoid torsion of the abrasion protection. Between the posts the abrasion protection protection has to be connected with a small additional rope and the distance between last abrasion profile and the post should be as small as possible. Additional staging to install the abrasion protection and additional fixed shackles to avoid torsion.

DIAGRAM 3.2.3.11 Additional fixed shackles to avoid torsion.

Final inspection

After finishing the installation a final inspection by the site engineer is necessary. The following points are necessary to check:

a) Are the anchors installed correctly and are the flexible heads in the right position?
b) Is the right number of support ropes installed?
c) Are the support rope fixed at the right anchors?
d) Is the ring net connected to the support, border and winglet ropes correctly?
e) Correct number of brake rings installed?
f) Is it possible that the brake rings can elongate without any problems?
g) Is the correct number of wire rope clips installed at the ropes?. Are the wire rope clips installed in the correct way?
h) Check the required torque and tighten the clips again.
i) Are the nets connected correctly?
j) Are the shackles bonded with adhesive (e.g., with Loctite?) if it is necessary?
k) Does the abrasion protection have enough large overlapping areas to ensure sufficient deformation?
l) Is the abrasion protection assured with shackles against torsion?
m) Are the brake rings of the lower support ropes bend upwards to the ring net?

When the installation of debris flow barriers can identify six the application possibilities cover a wide range of areas is:

1. **Individual barrier for retaining minor debris flows**

   Problem

   In the upper catchment area, an ancient rockfall area with schistic substrate, movement activities are leading to minor earthslips and debris flows that are endangering the settlement boundary. The aim is to brake the high energy debris flow in the very steep terrain and create retention basins for the mobilized material.

   Solution

   Downstream, with good accessibility and a flatter incline, a UX single barrier with a suitable capacity was installed that can fully withstand a possible event. A second ring net barrier in the steep terrain, in front of the single barrier, brakes the energy of the debris flow front.

2. **Debris flow breakers for braking the debris flow front**

   Problem

   Installed in front of a barrier, for breaking the debris flow front in very steep terrain without retaining large volumes of material.

   Solution

   Installation of a specially designed debris flow barrier with a stronger ring net, additional support ropes and brake rings for the targeted energy absorption of the debris flow front.

3. **Protection against the blocking of passages**

Problem

The pass road was flooded and jammed due to the block age of culverts. The aim was to retain the debris flow material before the culverts.

Solution

Installation of a ring net barrier directly in front of the culverts that retains solid material and allows watery, fine material to flow through. The material was retained in the course of three debris flow events without impairing the through traffic. Following excavation the barriers were again fully functional.

4. **Drain off element of a rubble collector**

Problem

An existing check dam is to be fortified with a ring net barrier for debris flow and rubble retention. Here the selected basal opening permits the normal high water flow and only is activated in the case of debris flow.

Solution

Enhancement of a two-sided dam with concrete flanks for anchoring the ring net barriers. Material retention and outflow capacity can be mutually adapted by means of the adjustable basal opening.

5. **Protection against scouring and erosion**

Problem

Continuous water and debris flow discharge had scoure away the footing of the concrete structure. The aim is to protect this footing and maintain the stability of the wall by means of a construction that piles debris flow material so that water and material discharge onto this retention cone.

Solution

Construction of a ring net barrier 5 to 10 m downstream of the concrete structure. After retention of the debris flow material, the ring net remains permanently backfilled in the channel, thus protecting the wall footing.

6. **Protecting the channel flanks against erosion**

Problem

Erosion through high water and debris flows is present in the channel and its flanks. The aim is to fill the stream-bed, thus stabilizing the flanks.

Solution

Individual dimensioning of two ring net barriers that remain filled and perform the function of a check dam. An abrasion protection at the top of support rope in the case of overtopping. The barriers flatten the channel slope and raise the energy grade line. The barriers are regularly monitored.

CHAPTER 4 : CONCLUSION & RECOMMENDATION

4.0 Conclusion

As a conclusion the installation of debris flow barriers a bit difficult because their used chain hoist to install all component or part of debris flow barriers. In theory to do all installation for component their used crane or helicopter it is because this component made from high stainless steel and it is difficult to used human energy. For this site is not suitable to used that way because the situation is not to be allowed to used the helicopter and crane.

4.1 Recommendation

The following tools are recommended for marking, installation and workers:

Marking

When do mark must planting the wooded with deeply to make sure their not loss or dated and also must clearly means easy to see or find.

Workers

When involve in manual work and the material used is high stainless steel we must use a lot of semi-skilled workers to construct this barriers.

Installation

When want to install all this component we must use helicopter to construct this barriers it is because all this component is made from high stainless steel and it is difficult to bring it up with chain hoist.

Equipment

For this installation we need the equipment which is durable, strong, can support with high capacity and so on.

References

dave, m. (2013, august 5). debris flow barriers. (luqman, Interviewer)

nizam, a. (2013, august 8). debris flow barriers. (luqman, Interviewer)

nuhairi, m. (2013, may 13). infrastructure. (luqman, Interviewer)

debris flow barriers. (n.d.). Retrieved july 03, 2013, from debris flow barriers: www.geobrugg.com

debris flow barriers. (n.d.). Retrieved august 27, 2013, from debris flow barriers: www.geovert.com/Geovert-Debris-Flow-Barriers.htm

multilevel debris flow barrier. (n.d.). Retrieved august 23, 2013, from multilevel debris flow barrier: www.benefits-of-recyling.com

flexible barriers against debris flows. (2007). Retrieved august 16, 2013, from flexible barriers against debris flows: http://www.wsl.ch/fe/gebirgshydrologie/massenbewegungen/projekte/KTI_Murgang/barrier_EN

List Of Appendix

Appendix 1: Drilling work.

Appendix 2: Marking of support and flexible rope.

Appendix 3: Post foundation.

Appendix 4: Clips

Appendix 5: Post

Appendix 6: Installation of support ropes

Appendix 7: Installation of post.

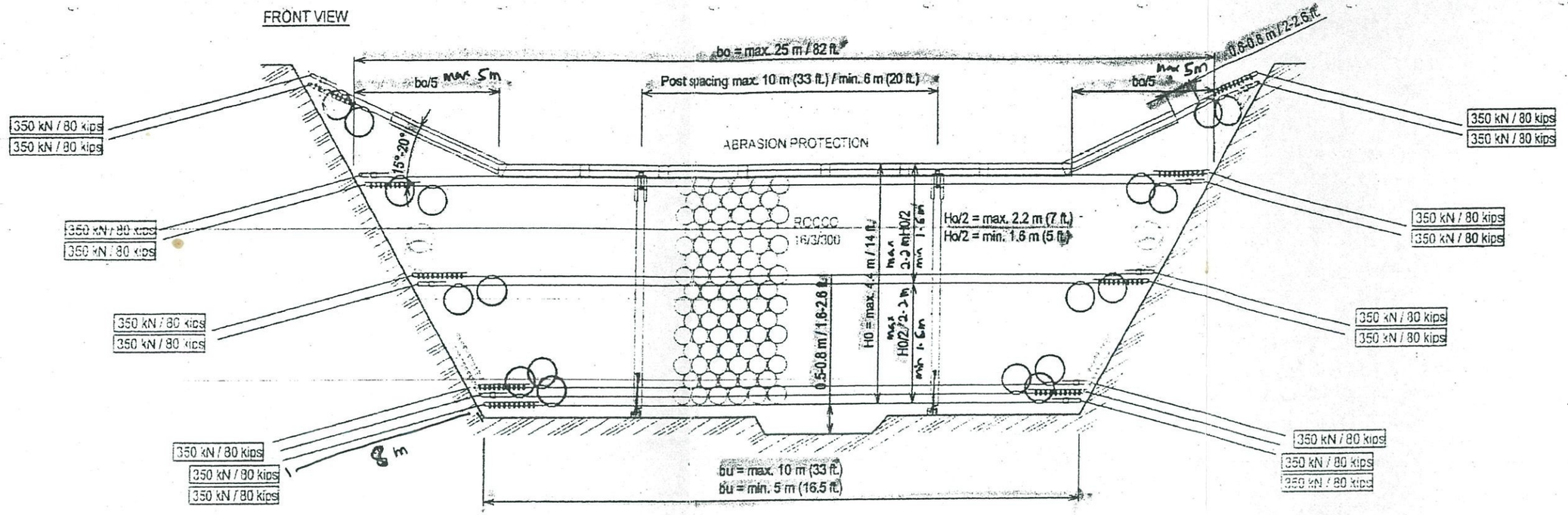
Appendix 8: Installation of ring net.

Appendix 9: Installation of flexible ropes.

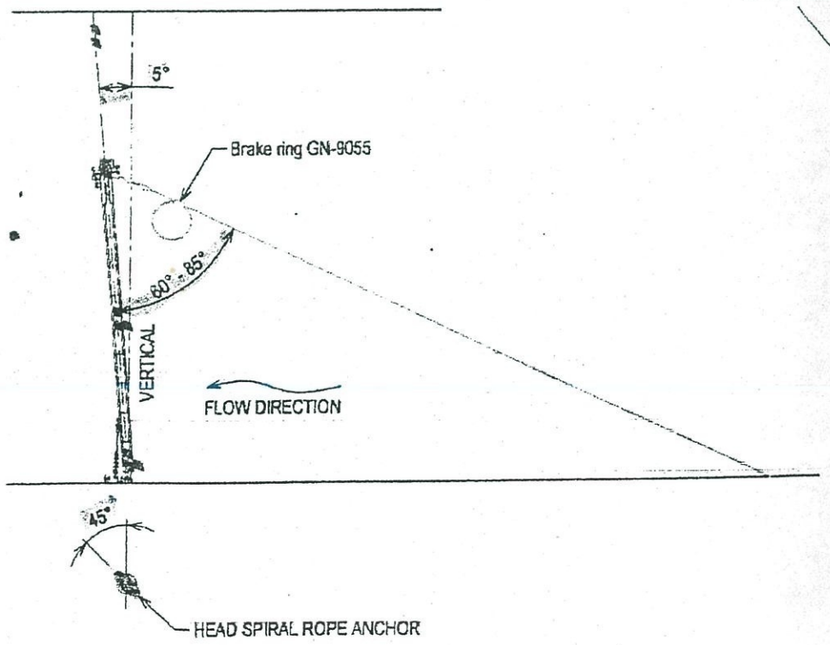
Appendix 10: Installation of overturn securing ropes

APPENDIX : II Front View

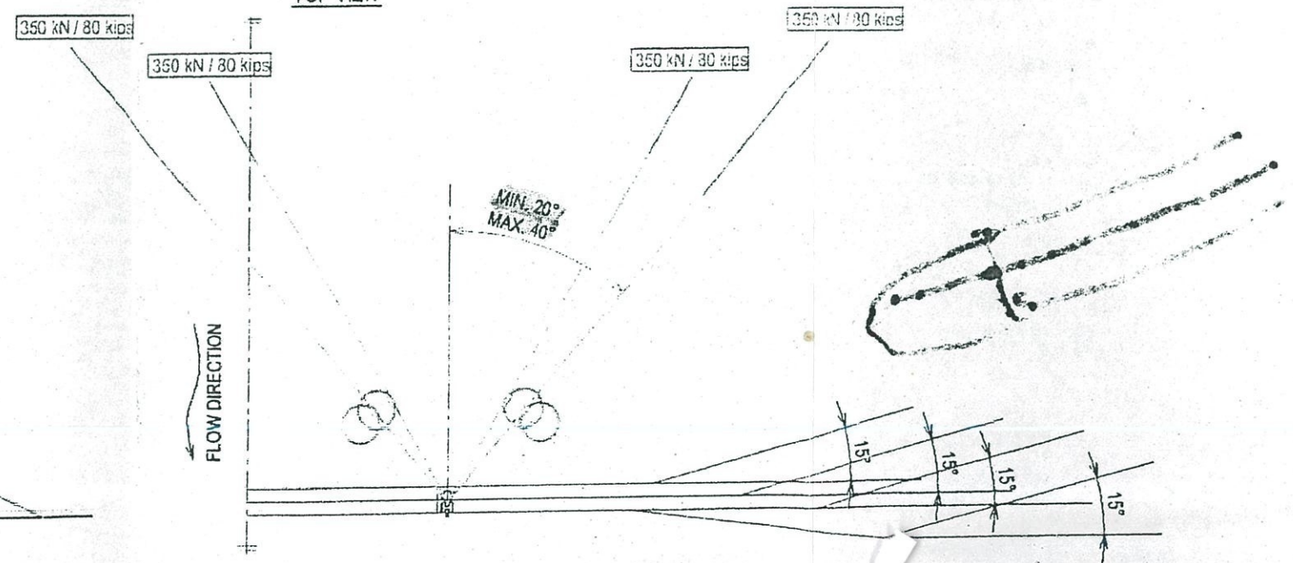
FRONT VIEW



SIDE VIEW



TOP VIEW



COMPONENTS:

SUPPORT ROPE ø22mm GEOBINEX WITH BRAKE RINGS GN-9017

This document is proprietary to GEOBRUGG AG and is copyrighted with all rights reserved. It may not in whole or in part, be distributed, copied in any form, translated or otherwise reproduced in any form.

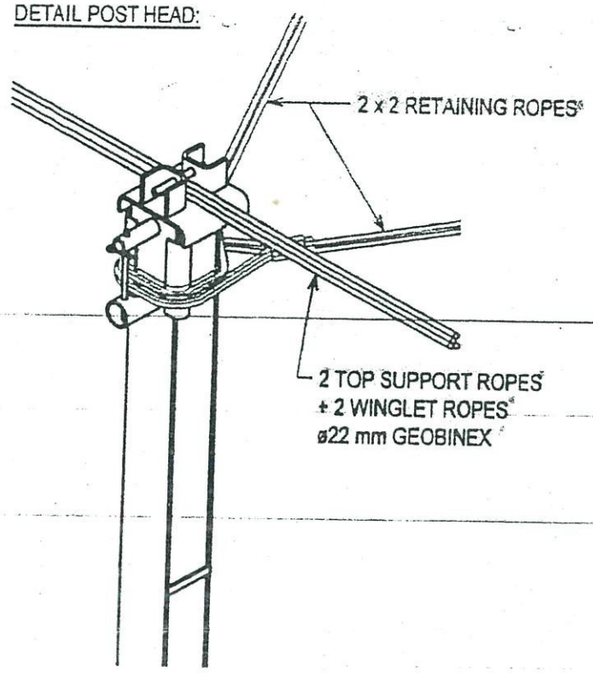
This document will not be exchanged, when being modified.

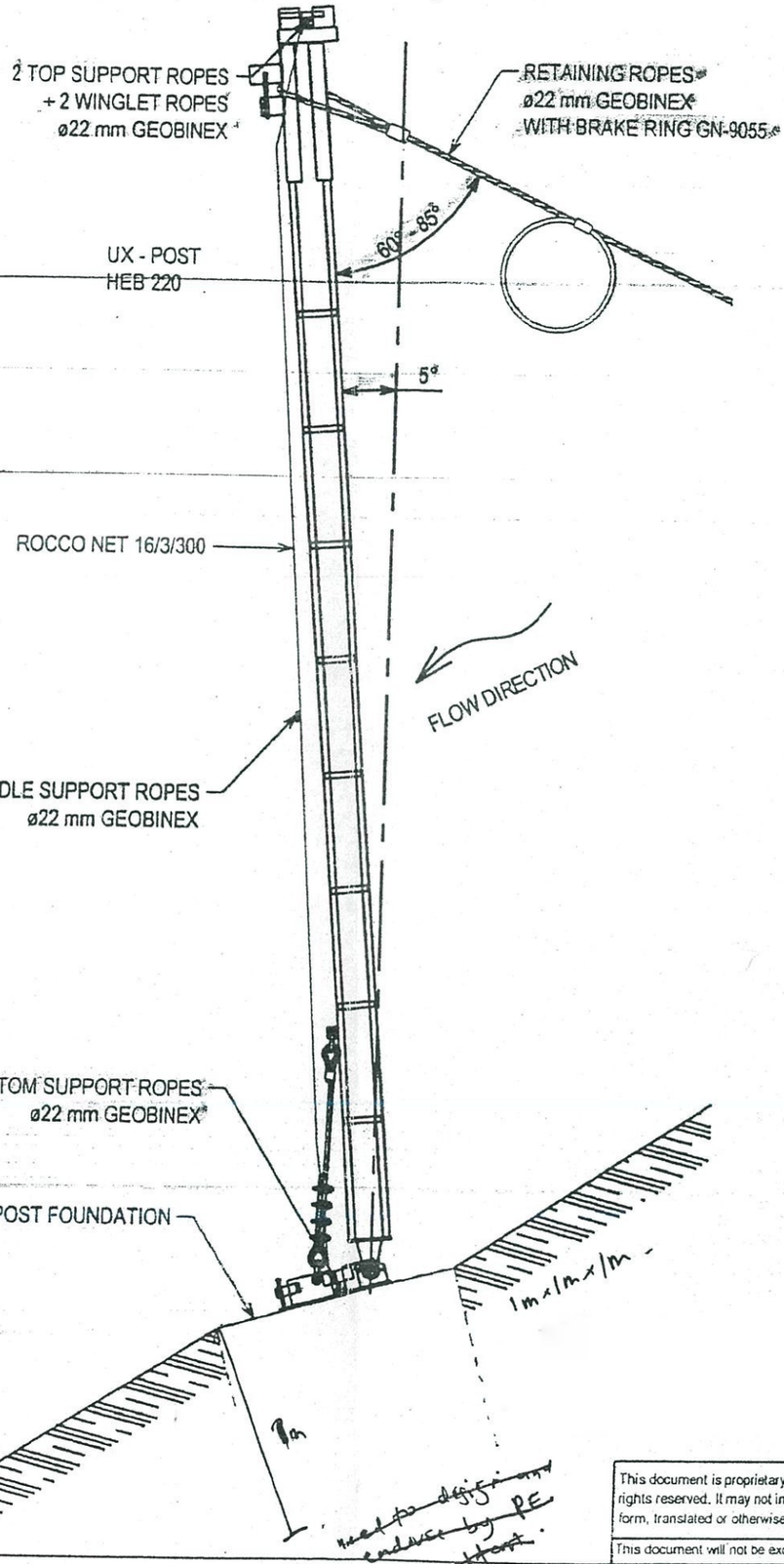
Modification: -	M:%	Substitute for: GD-1006 ed. 10.03.09 Replaced by:		
Debris Flow Protection System UX Type: UX160 - H4		Drawn	08.11.10	hb
		Checked	08.11.10	
		Approved	08.11.10	
GEOBRUGG AG CH-8590 Romanshorn		GD-1006.1e		

APPENDIX : II Front View

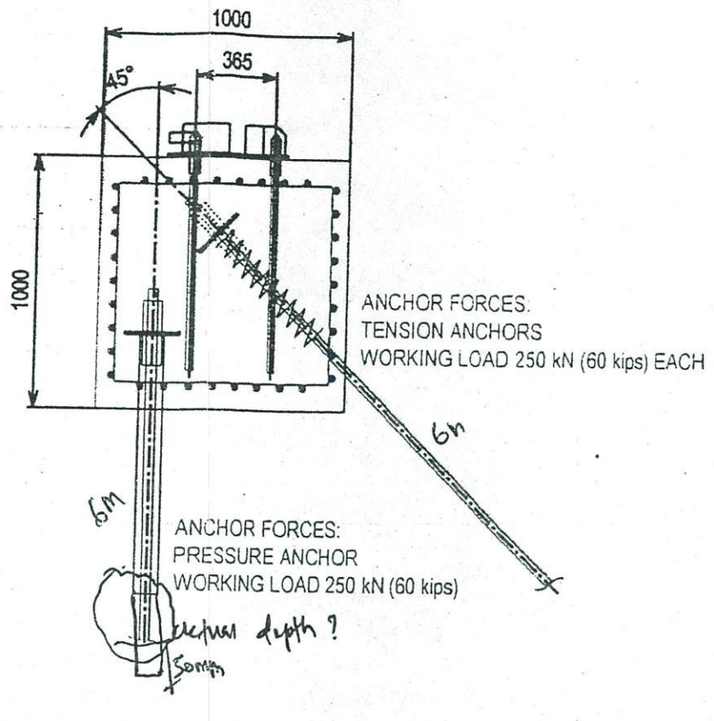
APPENDIX 12 : Detail Post

DETAIL POST HEAD:

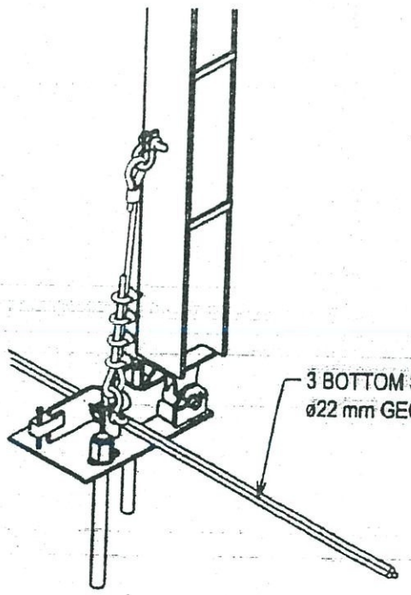


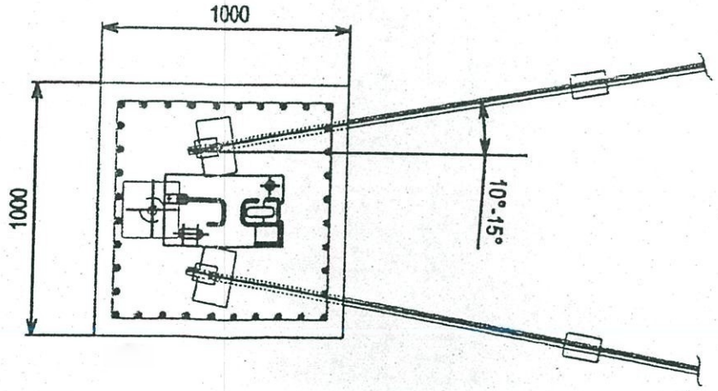


POST FOUNDATION:



DETAIL POST FOOT:



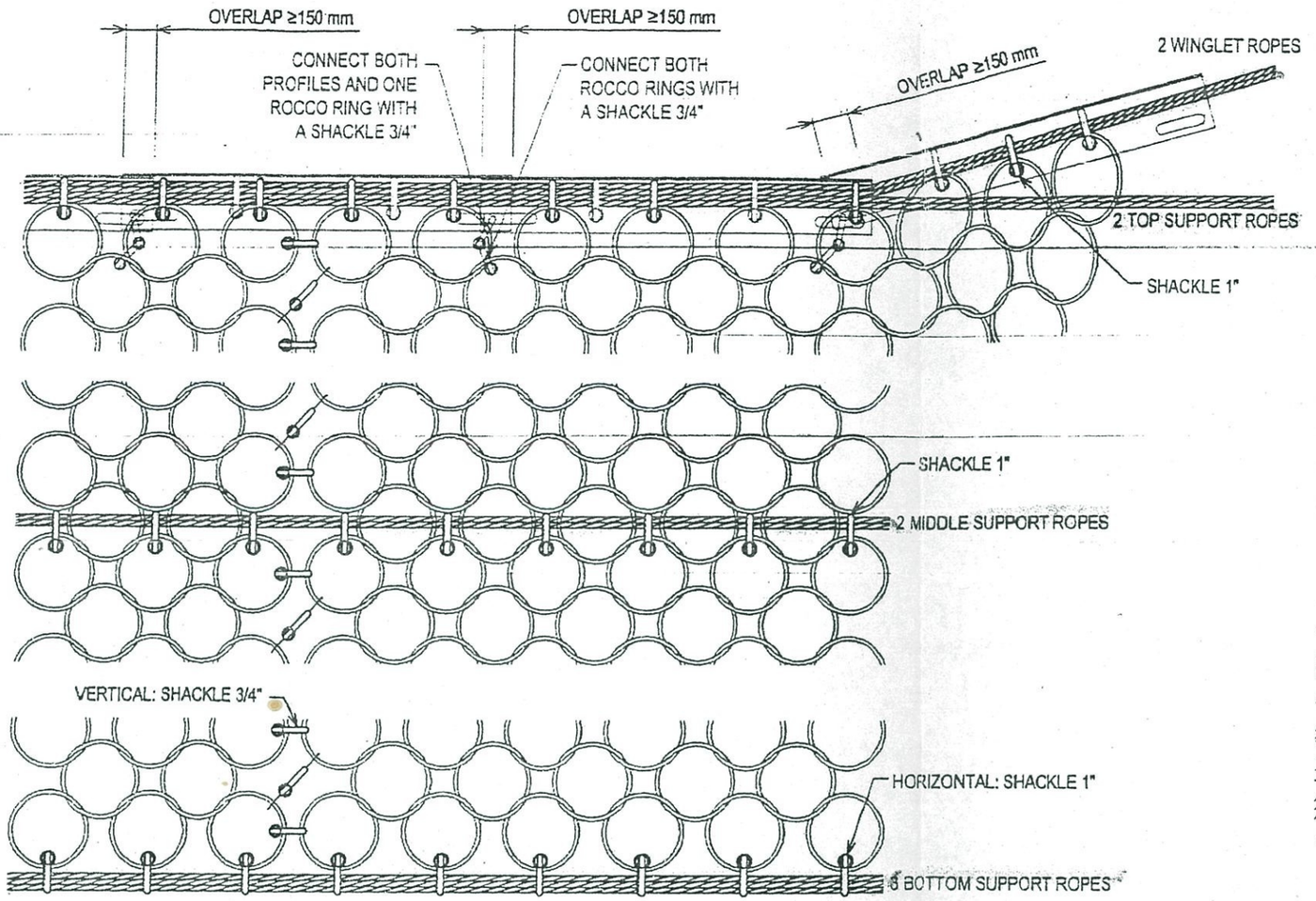


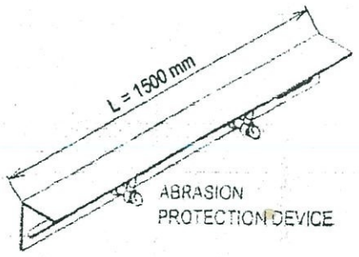
modification: -	M:%	substitute for: GD-1006.2e ed. 08.11.10 replaced by:		
Debris Flow Protection System UX Type: UX160 - H4 Details Post		drawn	19.09.12	hb
		checked	19.09.12	hb
		approved	19.09.12	
GEOBRUGG AG CH-8590 Romanshorn	GEOBRUGG	GD-1006.2e		

This document is proprietary to GEOBRUGG AG and is copyrighted with all rights reserved. It may not in whole or in part, be distributed, copied in any form, translated or otherwise reproduced in any form.
This document will not be exchanged, when being modified.

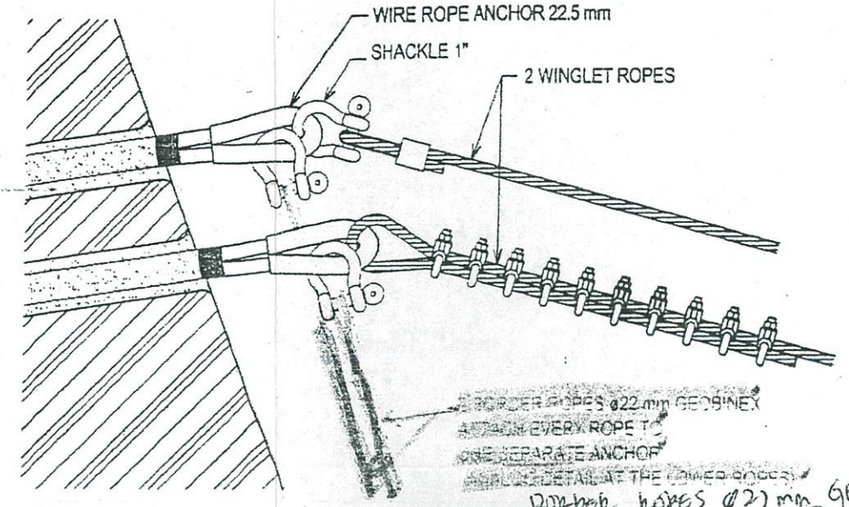
APPENDIX 12: Detail Post

APPENDIX 13: Detail of Connection

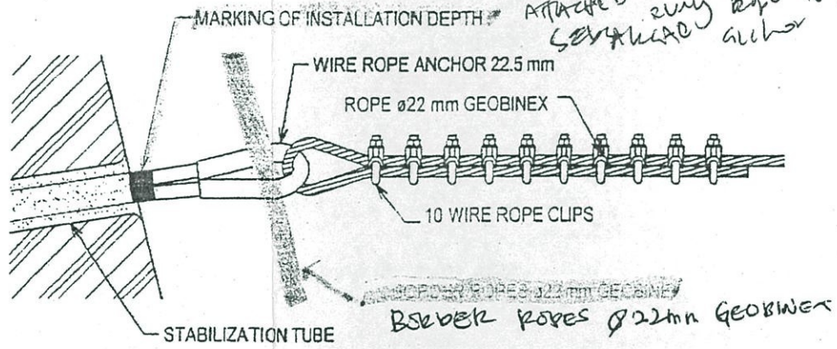




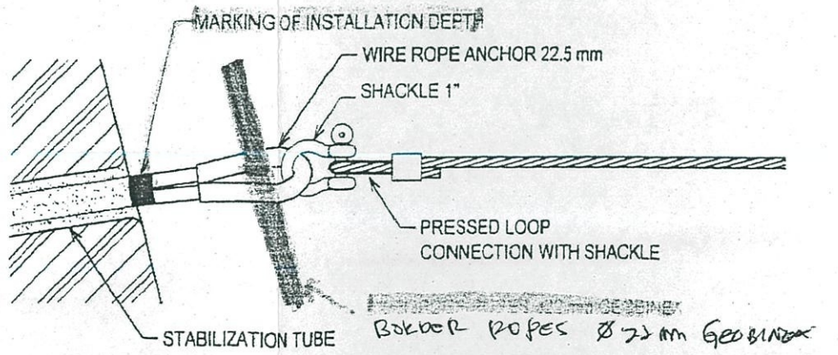
DETAIL OF CONNECTIONS:



Border ropes ø22 mm Geobinex attached every rope to one separate anchor



Border ropes ø22mm Geobinex



Border ropes ø22mm Geobinex

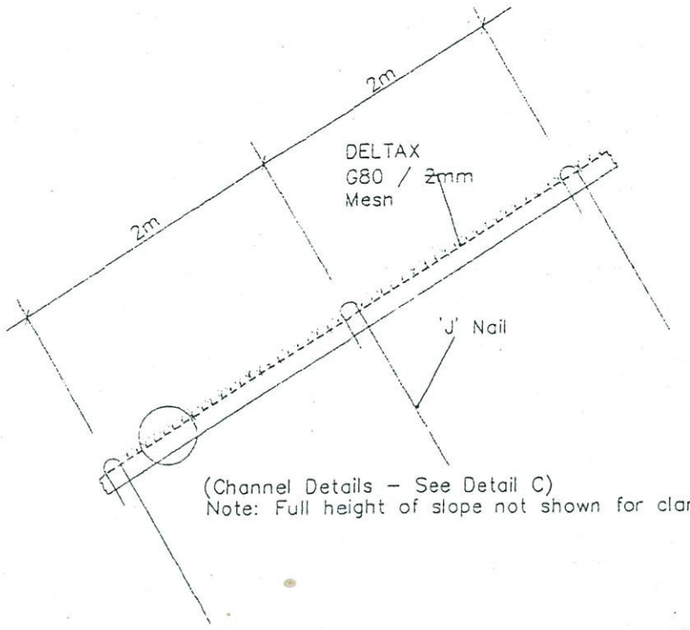
modification:	M:%	substitute for: GD-1006 ed. 10.03.09
-		replaced by:

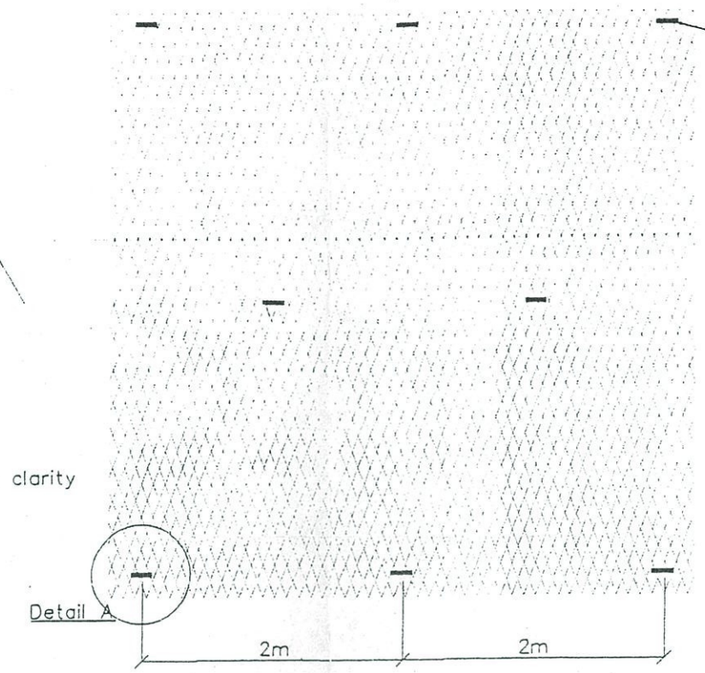
Debris Flow Protection System UX Type: UX160 - H4 Rope and net connection	drawn	08.11.10	hb
	checked	08.11.10	WO
	approved	08.11.10	WO
GEOBRUGG AG GEOBRUGG CH-8500 Romanshorn	GD-1006.3e		

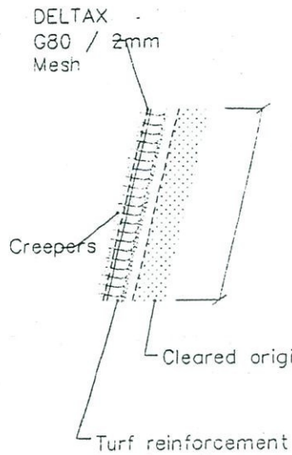
This document is proprietary to GEOBRUGG AG and is copyrighted with all rights reserved. It may not in whole or in part, be distributed, copied in any form, translated or otherwise reproduced in any form.
This document will not be exchanged when being modified.

APPENDIX 13: Detail of Connection

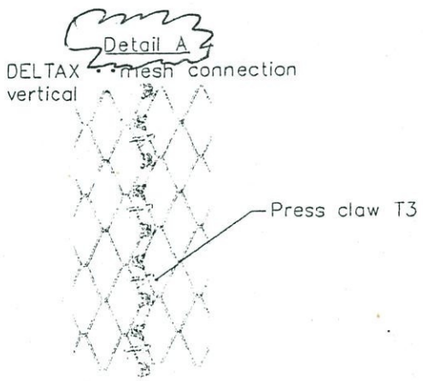
APPENDIX 14: Detail of Deltax

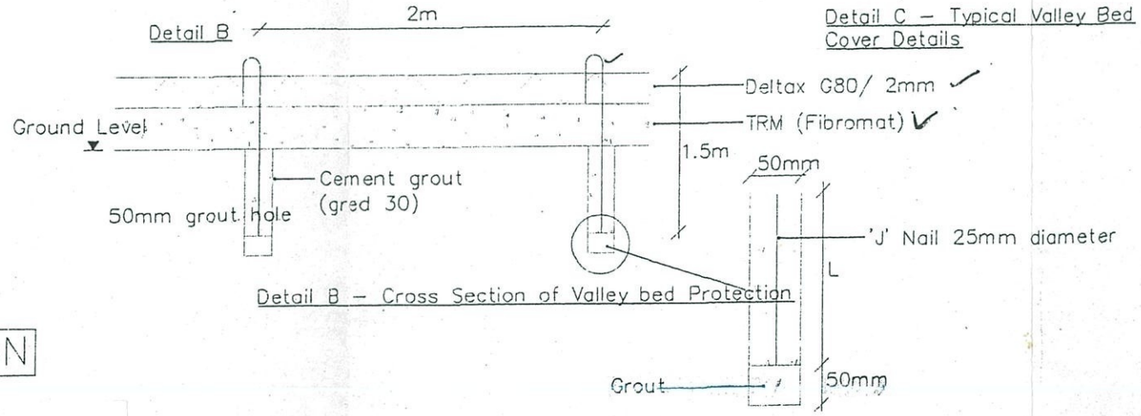






Detail C – Typical Valley Bed Cover Details





Detail B – Cross Section of Valley bed Protection

NOTES FOR INSTALLATION

Installation of T3 clips

The standard length of a roll of DELTAX mesh is 30 meters. The standard width is 3.5 meters. The roll is approx 79kg. After rolling down the mesh sheet, it must be connected lengthwise (normally in the line of the slope) by means of press claw (T3 Clip).Each individual edge–mesh must be secured with T3 clip to the neighbouring mesh from top to bottom when joining two rolls and the overlap of rolls must be two diamond mesh unit as illustrated below.

FOR CONSTRUCTION

JURUTERA PROFESIONAL
IR DR NIK KAMLAN
MS HASSAN
MALAYSIA

NOTA

TARIKH | PINDAAN / CATATAN | TANDATANGAN

CLIENT

JABATAN KERJA RAYA TERENGGANU

CONSULTANT

SDG CONSULT

MAIN CONTRACTOR

4HT (NORLAN UNITED) & CARRIEGE SDN BHD

SPECIALIST CONTRACTOR

EUROCULTURE S.E.A

EUROCULTURE S.E.A SDN BHD

SPECIALIST CONSULTANT

(a) Saya mengesahkan bahawa kerja-kerja yang akan / atau telah dijalankan adalah selaras dan bukan dari bahawa saya bertanggungjawab untuk pematuhan dan peraturan kerja yang akan / telah dijalankan oleh / atau
(c) Saya mengesahkan bahawa atas dan bawah telah memahami muatan tambahan dan / atau kegunaan baru.

ENGINEERING CONSULTANT

NO. 22A, JALAN BATU MUDA TAMBAHAN 5,
KAMPUNG BATU MUDA TAMBAHAN,
51100 KUALA LUMPUR.
TEL: 03-6177 6751 FAX: 03-6177 6752

PROJEK
CADANGAN PEMBANGUNAN ISTANA BARU TERENGGANU DI ATAS LOT 1330, MUKIM CHENDERING KUALA TERENGGANU, TERENGGANU DARUL IMAN.

TAJUK LUKISAN
VALLEY BED PROTECTION

DILUKIS OLEH : WARN
DISEMAK OLEH : KOSOR
SKALA : AS SHOWN
TARIKH : 19 MARCH 2014

APPENDIX 14: Detail Deltax