Quick Hitch Fan Cradle

Newcrest Mining Ltd – Cracow Gold Mine

The Problem – How do we make hanging secondary UG vent fans safe and efficient?
Underground secondary ventilation fans often require constant removal and re-installation. Large secondary fans are bulky items and can weigh in excess of 500kg. Installing secondary fans underground has traditionally been a very hazardous task and can take several hours of inefficient heavy labouring.

The traditional way of hanging a secondary vent fans consist of the following steps.
1. Initial installation of eye-bolts or brackets into the roof, usually performed by a service crew member using a handheld rock drill and working from an elevated work platform.
2. Lifting the fan to the backs using an elevated work platform (sometimes with specially designed brackets to hold the fan).
3. Service crew members on the same elevated work platform then wrap chains around the fan and attach them to the previously installed eye bolts in the backs.

The key risk exposures are:

- Strain injuries.
  - o Workers during both processes are exposed to heavy intensive manual labour.
- Crush injuries.
  - o Large fans can take up 70-80% of the available space in the roof, leaving little room to work around. While attaching chains and fitting cables a slight shift in the load or movement of the IT can result in a crush.
  - o Having heavy loads and personnel in the same lift exposes workers if the load were to drop or topple during the lift due to human error, incorrect loading, hydraulic failure, poor tie-down, or insufficient counterweigh.
- Fall Hazards.
  - o When lifted into the air to attach bolts or chains, workers are often observed hanging over the side of the baskets to reach around the fans to complete the task.
- Mechanical failure.
  - o The chains used to secure the fan to the backs must be specifically rated to hold the load and withstand the constant vibration created by the fan over long periods. Incorrect rating of chain, previous usage, damage or incorrect securing can result in a fan drop.
- Inefficient.
  - o The traditional method can take a number of hours and is an inefficient use of time, labour and equipment.

The Solution
No particular incidents occurred at Cracow Mine to prompt the redesign, but JHA's for the task continually resulted in high residual risks due to an inability to eliminate or further reduce the risk inherent in the old method. The highest residual risk concerns were crushing and fall injuries to workers due to the height involved and the weight of unsecured items able to crush. The elimination of hanging fans altogether (having them sit on the ground) was considered, but was deemed impractical due to: Extensive re-development or stripping in established areas, The potential for damage to fans by being in a strike zone, Rocks/ debris being sucked into the fan by being close to the ground in declines, Inefficient pick-up and outlet zones for the air flow if positioned off-decline on the ground.

Removal of people from the process of hanging was deemed the only way of comprehensively addressing the residual risks. Next in the hierarchy of control substituting was considered: Manual attachment (exposing people) substituted for some sort of mechanical attachment (personnel exposure eliminated) was required. As a result the Quick Hitch Fan Cradle was designed, developed and implemented into mine wide service at the Cracow Gold Mine.

The Quick Hitch Fan Cradle was initially scoped and designed onsite by the management team and then sent to AECOM engineers for formal drafting, specification of materials and certification of design fit for purpose, including manufacturing and testing instructions. (See attached engineering drawings).

The quick hitch fan cradle works by allowing any fan to mechanically attach to a pre-hung receiver in the backs, without the requirement for any person to be within the dangerous crush and drop area at the time of hanging or removal. The solution also takes a fraction of the time for fan installation and removal.

The design was initially trailed on one fan to prove success before further orders were placed. Workers in the mine found the process faster, safer and easier than the traditional method. All fans at Cracow are now hung using the quick hitch fan cradle.

Method and components

The quick hitch fan cradle consists of the following main components: (also pictured below)

- IT extender arm – Not part of the fan cradle, but used to carry and hold the Receiver cradle against the roof while a jumbo drill installs resin rock bolts through its bolting points.
- Receiver cradle – this I shaped bracket is pre-installed in the roof before a fan is required. The receiver cradle receives the hitching rail and holds the fan against the roof.
- Hitch rail – provides the interface between the fan and the receiver cradle. The hitch rail has standard spaced hitching hooks on the top side which attach to the receiver cradle. The bottom side has movable brackets that attach to the lifting points on the top of the fan. The movement of the brackets makes the fan cradle generic to all fans.

Installation of the fan simply requires the fan to be lifted into place using a fan lifting cradle attached to the front end of an IT. The IT operator lines up the hitching hooks on the hitch rail with the receiver points on the bottom of the receiver cradle and slides the two into place with the assistance of built in guilds. Once the fan is hitched, the IT lowers the lifting cradle and the fan remains in place. Removal of the fan requires the opposite movement.

Hitching and unhitching requires positive up-lift pressure and either forward or backward movement to un-couple the hooks from the receiver. There are no moving parts and positive "red painted" indicators on the leading edge of the insertion plates provide visual confirmation of successful hitching before the IT operator moves away. The fan cradle can be installed on any gradient, however the entry direction of the receivers must be at least down-hill to further resist any "bounce out" of the locking mechanism if hit by a passing heavy vehicle. The actual blow direction of the fan can face either way.

Two additional but redundant safety aspects were added to the design for peace of mind.

1. Locking plates can be installed behind the hitch receiving points to completely encase the attachment points. If necessary.
2. Secondary safety chains can be wrapped around the fan for peace of mind. To avoid risk they can be pre-attached in two parts to designated hang points before the fan is hung and joined below the fan to avoid any worker being required to place themselves in a fall/crush location above the fan. This will not impede the installation process.

Benefits

The use of the fan cradle has been fully implemented throughout the Mine. The use of this system has significantly reduced the risk to personnel during hanging and removal of secondary fans, reduced the latent risk of fan drop and has had more than 100% pay back in less than 6 months due to the speed and efficiency of fan moves.

- Fall or crush risk to personnel during the installation/removal process - **eliminated**.
- The lifting of personnel in a basket during a heavy lift - **eliminated**.
- The mis-selection of damaged or under-rated primary hanging chains - **eliminated**.
- Poor tie down and attachment of the chains to eye-bolts - **eliminated**.
- Manual process to install eye-bolts – **eliminated**.
- Manual processes to attach eye-bolts to the backs at height - **eliminated**.
- All tasks required are completed mechanically. Heavy manual labour- **eliminated**.
- The cradle has been designed, engineered and certified to task. Failure risk – **ALARA**.

Transferability

The fan cradle is completely transferable to any mine/tunnel project requiring secondary fans. The generic hitch rail can be fitted to any fan with lifting points. The cradle will suit both metal and coal mines. Newcrest has not placed any IP on this product, and gives the information freely in the hope of achieving a safer industry.

Innovation

A search of the Australian industry conducted by site before commencing on this project found no other commercially available method.

Image 1 – Hung fan Twin 110kw

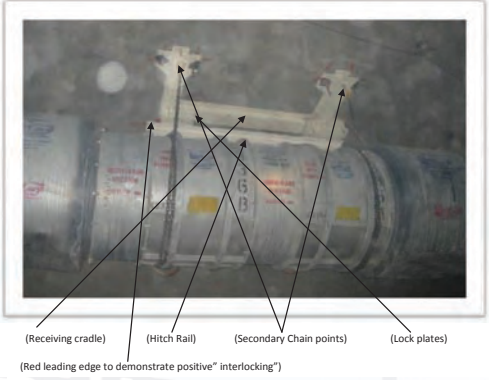
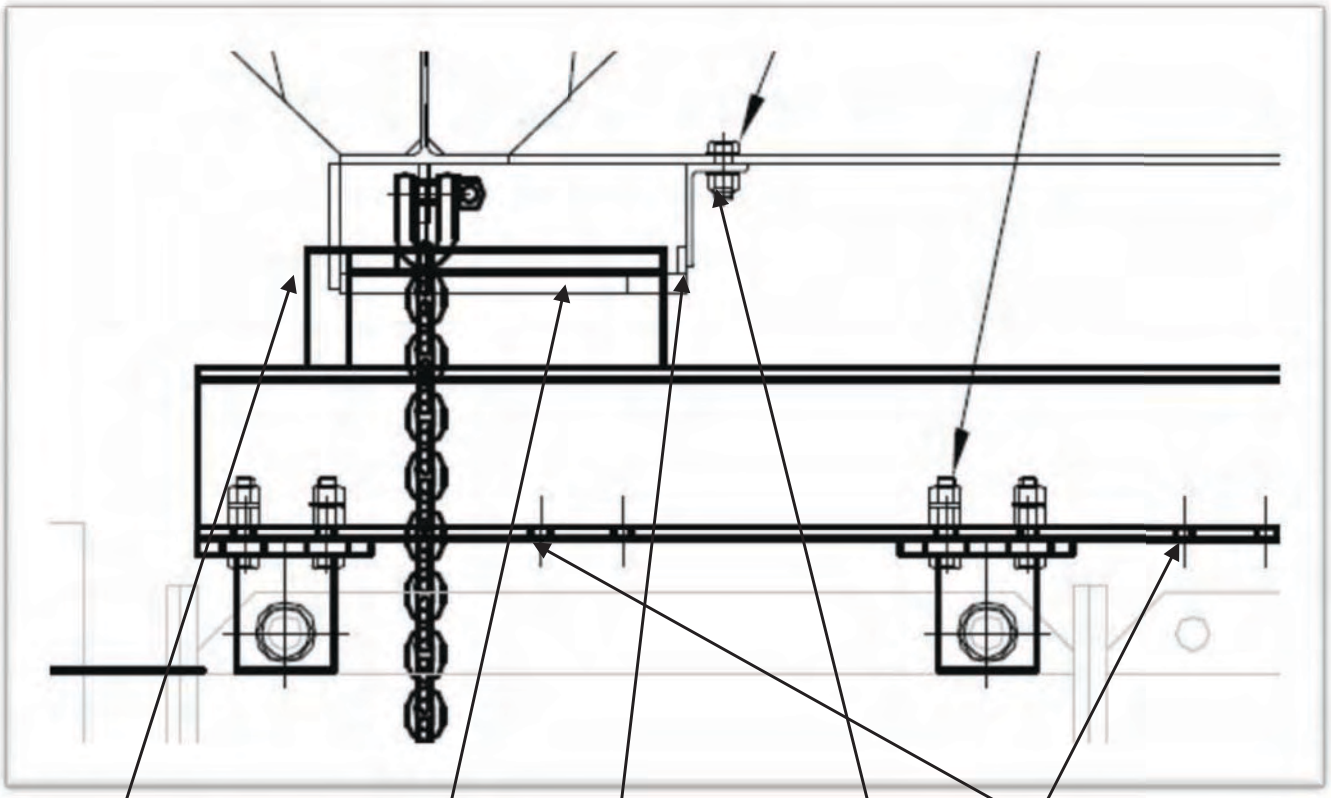
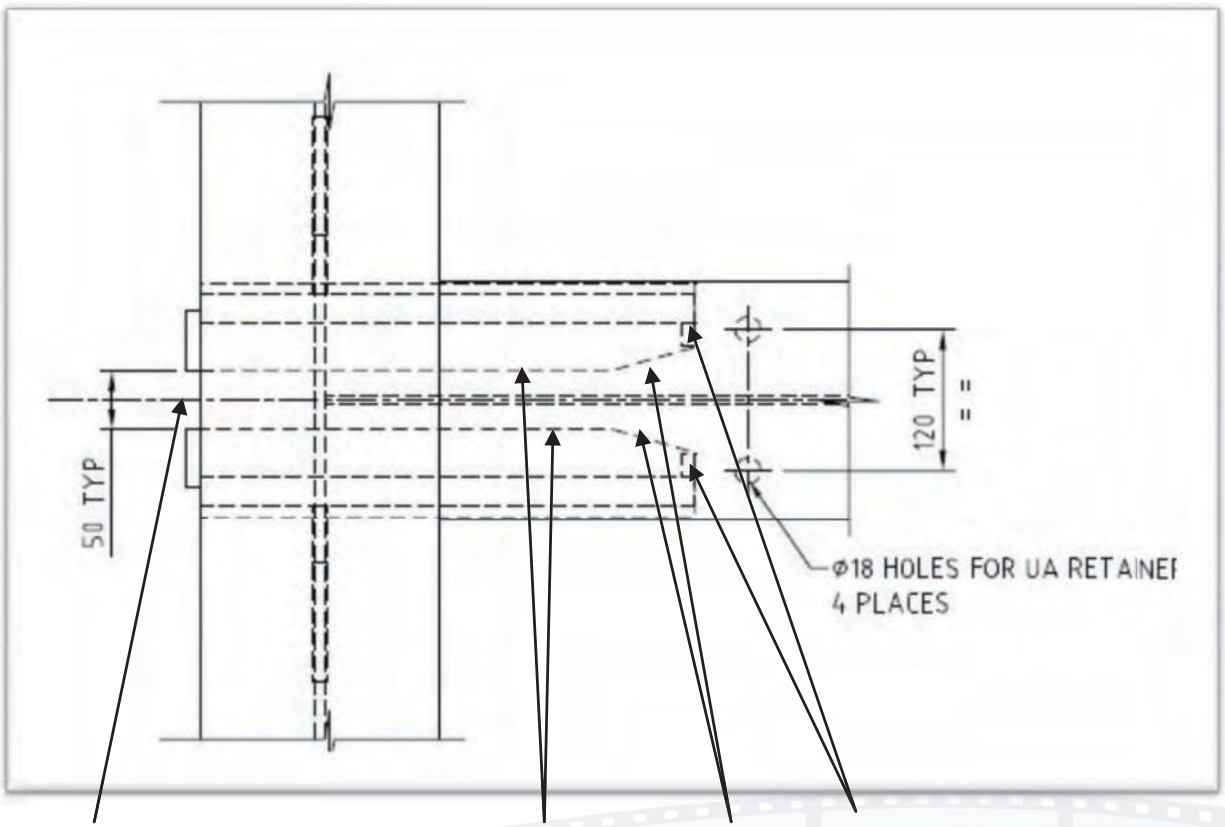


Image 2 – Hung fan Twin 110kw



(Leading edge “lock in” indicator) (Horizontal plates) (Leading Lip) (Secondary locking plate) (Alternate attachment points for different sized fans)

Image 3 – Close-up of hitch point (Side View)



(End gap to allow indicator edge to protrude) (Split receiving plates) (Guide rails) (Leading lip)

Image 4 – Close-up of hitch point (Top View)

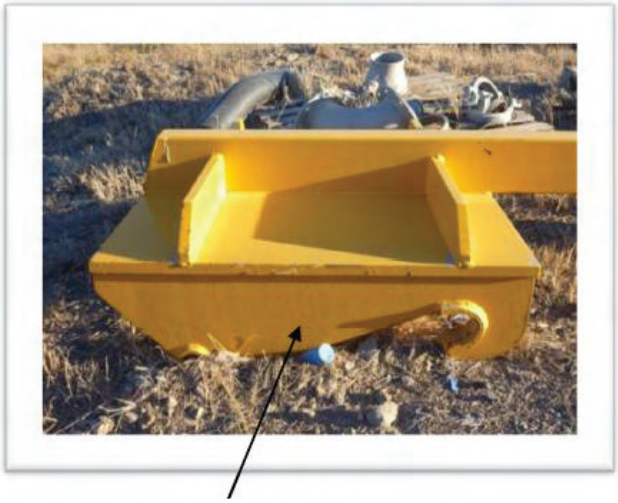
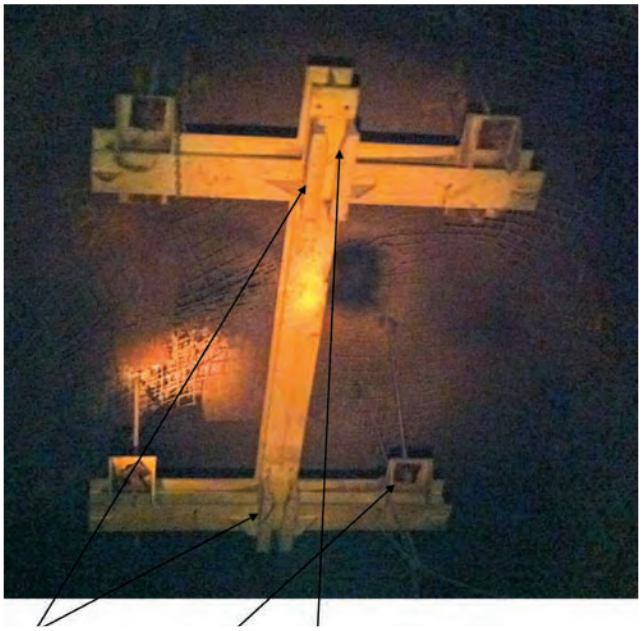


Image 5 – IT extension arm (IT Quick hitch attachment)

Image 6 – IT extension arm (receiver cradle attachment points)

Image 7 – Installed Receiver cradle.



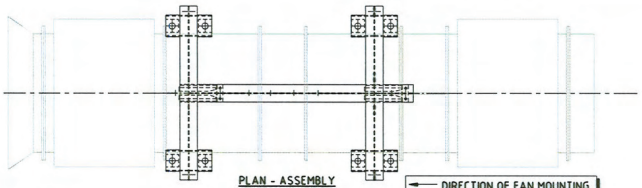
(Receiver points) (Rock bolt attachment points) (Built in guides)

Other Notes:

- Construction cost in a batch of 5, was approximately $6000 each, all inclusive.
- Engineering design, drawing and certification of design, approx $25,000.
- All installations have been incident free.

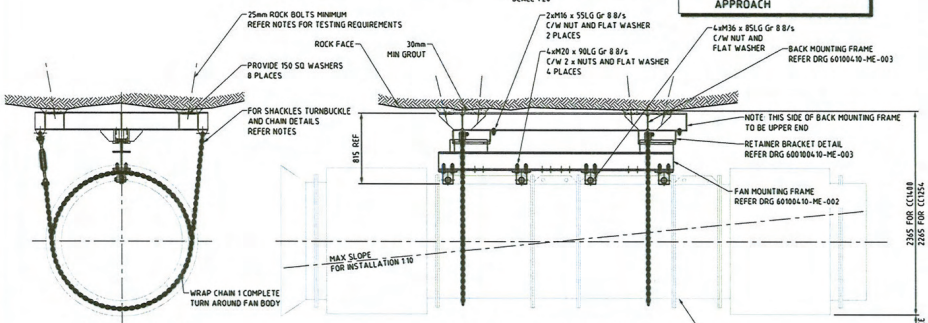
SAFETY CHAIN NOTES:

ALL CHAINS TO BE 10mm GRADE 'T', WLL = 2.5t MINIMUM
ALL SHACKLES TO BE 13mm GRADE 'T', WLL = 2.5T MINIMUM
ALL TURNBUCKLE TO BE 20mm GRADE 'S', WLL = 2.5t MINIMUM



PLAN - ASSEMBLY
SCALE 1:20

DIRECTION OF FAN MOUNTING APPROACH



END ELEVATION - ASSEMBLY
SCALE 1:20

ELEVATION - ASSEMBLY
SCALE 1:20

INSTALLATION PROCEDURE NOTES TO SUIT FAN TYPES CC1400 & CC1254

1. FAN MOUNTING ASSEMBLY IS ONLY TO BE USED WITH THE FOLLOWING FANS
   - CLEMCORP CC1254 (2 X 55KW)
   - CLEMCORP CC1400 (2 X 90KW)
   - CLEMCORP CC1400 (2 X 110KW)
2. THE FOLLOWING MINIMUM BACK HEIGHT IS REQUIRED FOR THE CORRESPONDING FANS.
   - CLEMCORP CC1254 - 6445mm
   - CLEMCORP CC1400 - 6545mm
3. INSTALL THE BACK MOUNTING FRAME INTO THE BACKS WITH ROCK BOLTS AND GROUT AS PER THE ROCK BOLT NOTES ABOVE
4. ENSURE THE BACK MOUNTING FRAME IS SQUARE AND PARALLEL WITH THE DRIVE. LEVEL AS REQUIRED.
5. INSTALL THE FAN MOUNTING FRAME TO THE REQUIRED FAN USING THE SPECIFIED FAN SUPPORT LUGS. 4 REQUIRED IN TOTAL
6. MOUNT FAN TO FAN LIFTING CRADLE ENSURING THE DIRECTION OF MOUNTING IS CORRECT AS PER THE DRAWINGS
7. TRANSPORT FAN AND CRADLE AND LOCATE ALIGNED WITH THE BACK MOUNTED FRAME
8. WITH A SPOTTER IN PLACE, LIFT THE FAN AND CRADLE AND SLIDE THE ASSEMBLY INTO PLACE
9. ENSURE THE FAN IS CORRECTLY FITTED TO THE BACK MOUNTED FRAME. A VISUAL AID IS LOCATED ON THE FRONT OF THE FRAME TO ASSIST THIS PROCESS
10. WHEN CORRECT LOCATION HAS BEEN CONFIRMED, DETACH THE FAN ASSEMBLY FROM THE LIFTING CRADLE AND REMOVE CRADLE AND LIFTING VEHICLE
11. WITH A PERSONNEL LIFT, INSTALL THE EQUAL ANGLE RETAINERS AS PER THE DRAWINGS
12. INSTALL THE SAFETY CHAINS AND TURNBUCKLES TO THE FAN ASSEMBLY, REMOVING ALL SLACK BUT ENSURING FAN IS NOT LIFTED FROM FRAME
13. COMPLETE ELECTRICAL INSTALLATION

ROCK BOLTS NOTES:

GENERAL

- THESE NOTES APPLY TO ROCK BOLTED BRACKETS FOR SUPPORTING AND RESTRAINING MECHANICAL EQUIPMENT

ROCK BOLTS

- THE DIAMETER AND NUMBER OF ROCK BOLTS AND THEIR DISTRIBUTION AS SHOWN ON THE DESIGN DRAWINGS HAVE BEEN BASED ON ROCK BOLTS WITH A MINIMUM ULTIMATE TENSILE STRESS OF 550 MPa WHICH RESULTS IN THE FOLLOWING TENSILE STRENGTHS

TABLE 1. MINIMUM ULTIMATE TENSILE STRENGTH (BREAKING LOAD)					
NOMINAL DIAMETER (mm)	16	20	25	28	32
MINIMUM UTS (kN)	110	173	270	339	442

- SUITABLE ROCK BOLTS AVAILABLE IN AUSTRALIA INCLUDE
  - DSI-DYWIDAG THREADBAR
  - STRATA CONTROL SYSTEMS CT BOLTS AND THREAD BARS
  - REIDBAR
  - RMD THREADBOLT

(CONTINUED)

ROCK BOLTS NOTES: (CONTINUED)

- GROUND SUPPORT ROCK ANCHORS SHALL NOT BE USED TO SUPPORT OR RESTRAIN THE MECHANICAL EQUIPMENT
  ROCK BOLTS SHALL BE ALIGNED GENERALLY NORMAL TO THE ROCK FACE, AND BRACKET BASE PLATES SHALL BE ALIGNED GENERALLY PARALLEL TO THE ROCK FACE. THE BRACKETS HAVE BEEN DESIGNED TO ACCOMMODATE VARIATIONS IN THE ALIGNMENT OF THE ROCK FACE FROM THAT SHOWN ON THE EXCAVATION DRAWINGS. IF THERE IS ANY CONCERN REGARDING THE ALIGNMENT OF THE ROCK FACE, THE DESIGN ENGINEER SHALL BE CONSULTED.
- ALL ROCK BOLTS USED TO ATTACH BRACKET BASE PLATES TO THE ROCK SHALL BE FITTED WITH A DOME PLATE, HEMISPHERICAL WASHER, AND NUT. THE ROCK BOLT SHALL PROJECT AT LEAST 15mm BEYOND THE NUT.

ROCK BOLT ANCHORAGE

- AN EXPERIENCED GEOTECHNICAL ENGINEER SHALL SUPPLY THE NECESSARY WRITTEN ADVICE ON EMBEDMENT LENGTH, HOLE DIAMETER AND ANCHORAGE METHOD FOR ROCK BOLT INSTALLATION TO SUIT THE ROCK. THE ANCHORAGE METHOD SHALL MINIMISE THE POSSIBILITY OF ANY CORROSION
- THE ANCHORAGE SHALL BE DESIGNED SO THAT EACH INDIVIDUAL ROCK BOLT IS SIMULTANEOUSLY ABLE TO ACHIEVE THE MINIMUM ULTIMATE TENSILE STRENGTH GIVEN IN TABLE 1. THIS MEANS THAT THE ULTIMATE TENSILE ANCHORAGE CAPACITY OF A GROUP OF ROCK BOLTS THAT ATTACH A BRACKET OR REINFORCED CONCRETE TO THE ROCK SHALL BE EQUAL TO THE SUM OF THE MINIMUM ULTIMATE TENSILE STRENGTHS OF THE INDIVIDUAL ROCK BOLTS
- IN OPERATION, THE ROCK BOLTED BRACKETS MAY BE SUBJECT TO A "SHEAR" FORCE. THE MAXIMUM LIMIT STATE DESIGN SHEAR FORCE FOR ANY BRACKET IS LIMITED TO 0.35 TIMES THE ULTIMATE TENSILE ANCHORAGE CAPACITY OF ITS GROUP OF ROCK BOLTS. THE GEOTECHNICAL ENGINEER MUST CONFIRM THE CAPACITY OF THE AS-MINED ROCK EXCEEDS THIS SHEAR FORCE IN ALL DIRECTIONS. IF THERE IS DIFFICULTY ENSURING THIS IN CERTAIN DIRECTIONS, THE DESIGN ENGINEER CAN ADVISE THE EXACT MAGNITUDE AND DIRECTION OF THE APPLIED FORCES.

GROUT BETWEEN THE ROCK AND BRACKET BASE BOLTS

- THE ROCK FACE SHALL BE CLEANED & BLOWN OFF PRIOR TO GROUTING. ANY SHOTCRETE SHALL BE REMOVED UNLESS ITS IN-SITU STRENGTH IS TESTED & PROVEN TO EXCEED 32 MPa
- THE GROUT BETWEEN THE BRACKET BASE PLATE AND THE ROCK SHALL BE NON-SHRINK CEMENT BASED GROUT WITH A MINIMUM COMPRESSIVE STRENGTH OF 50 MPa AT 28 DAYS

PRE-TENSIONING ROCK BOLTS

- THE ROCK BOLTS SHALL BE PRE-TENSIONED BY A FEW IMPACTS OF AN IMPACT WRENCH OR BY THE FULL EFFORT OF A PERSON USING A STANDARD POGGER SPANNER. THE BOLTS SHALL NOT BE TENSIONED UNTIL THE BASE PLATE GROUT HAS CURED A MINIMUM OF 3 DAYS AND UNTIL THE ROCK BOLT ANCHORAGE GROUT OR EPOXY HAS "FULLY" CURED.

PROOF TESTING

- PROOF TEST FORCE = 88 KN
- TESTING OF INDIVIDUAL ROCK BOLTS AND ROCK BOLTED BRACKETS IS ONLY REQUIRED IN ORDER TO PROVE THE CAPACITY OF THE ROCK AND THE CAPACITY OF THE ANCHORAGE TO THE ROCK. THE FOLLOWING NOTES DESCRIBE AECOM'S REQUIREMENTS FOR TESTING.
- THE GEOTECHNICAL ENGINEER RESPONSIBLE FOR THE DESIGN OF THE ROCK BOLT ANCHORAGE MAY CHOOSE TO INCREASE OR DECREASE THE NUMBER OF BOLTS AND BRACKETS TO BE TESTED, DEPENDING ON ROCK CONDITIONS.
- TESTING SHALL BE CARRIED OUT BEFORE USE. THE TESTING OF ROCK BOLTED BRACKETS SHALL NOT BE UNDERTAKEN UNTIL THE BASE PLATE GROUT HAS CURED A MINIMUM OF 7 DAYS AND UNTIL THE ROCK BOLT ANCHORAGE GROUT OR EPOXY HAS "FULLY" CURED. WHERE THE DESIGN DRAWINGS SHOW COGS ON THE REINFORCING BARS FOR ANCHORING REINFORCED CONCRETE TO ROCK, THESE SHOULD BE BENT AFTER TESTING.
- THE TEST FORCE IS TO BE APPLIED TO INDIVIDUAL EYEBOLTS AND TO INDIVIDUAL REINFORCING BARS THAT ARE USED TO ANCHOR REINFORCED CONCRETE TO ROCK. WHERE BRACKETS ARE ATTACHED TO THE ROCK WITH A NUMBER OF ROCK BOLTS, THE TEST FORCE IS TO BE APPLIED TO THE BRACKET SO THAT ALL THE ROCK BOLTS ARE TENSIONED.
- TESTING SHALL BE IN AN APPROVED MANNER. THE ROCK IMMEDIATELY AROUND THE ROCK BOLT OR ROCK BOLTED BRACKET SHALL NOT BE USED AS A "REACTION SURFACE" FOR THE APPLICATION OF TEST LOADS, AS THIS WOULD NOT PROVE THE ADEQUACY OF THE ROCK, ONLY THE ADEQUACY OF THE ANCHORAGE TO THE ROCK.
- IF THE DIRECTION OF THE TEST FORCE IS NOT SHOWN ON THE DESIGN DRAWINGS, IT SHALL BE NORMAL TO THE FACE OF THE ROCK AS SHOWN ON THE EXCAVATION DRAWINGS.
- THE TEST FORCE SHALL BE MAINTAINED FOR AT LEAST 15 MINS.
- NO PERMANENT DISPLACEMENT OF THE BRACKET OR ROCK BOLTS SHALL BE MEASURABLE FOLLOWING THE TEST.
- THE RESULTS OF THE TEST SHALL BE WRITTEN ON A COPY OF THE RELEVANT DESIGN DRAWING ALONGSIDE THE INDIVIDUAL ROCK BOLT OR BRACKET, DATED AND SIGNED BY THE TESTER, AND SUPPLIED TO THE CLIENT OR THE CLIENTS REPRESENTATIVE.

No	BY	DATE	DESCRIPTION	APPD
0	BKM	03/07/09	ISSUED FOR CONSTRUCTION	AC
A	ARB	29/06/09	ISSUED FOR CLIENT REVIEW	

Scale: AS NOTED

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED IN ACCORDANCE WITH THE AECOM QUALITY ASSURANCE SYSTEM TO ISO 9001:2000

DESIGNED	MG	CHECKED	PN
DRAWN	ARB	CHECKED	PAB
APPROVED	AC	DATE	08/07/09

Cad ref: J:\Projects\60100410\5 CAD\5.3 Working\60100410 002.dwg
Last modified: 08 Jul 09 - 16:09

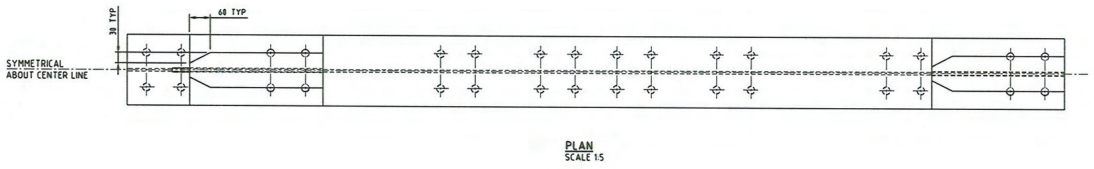
AECOM

RPEQ No
AECOM Australia Pty Ltd A.B.N. 20 093 846 925

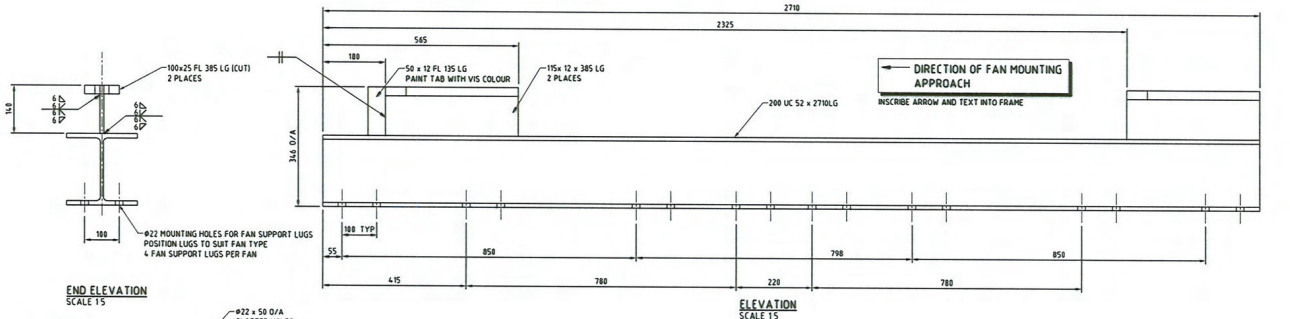
ISSUED FOR CONSTRUCTION

CRACOW GOLD MINE
BACK MOUNTED FAN INSTALLATION
FAN MOUNTING ASSEMBLY
GENERAL ARRANGEMENT

Status: CONSTRUCTION
Dwg No: 60100410-ME-001
Rev: 0

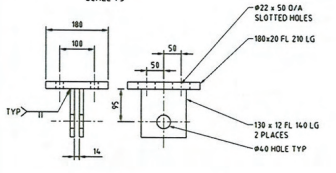


PLAN
SCALE 1:5

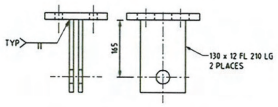


END ELEVATION
SCALE 1:5

ELEVATION
SCALE 1:5



FAN SUPPORT LUG DETAIL TYPE CC1400
SCALE 1:5
PROVIDE 4 OFF



FAN SUPPORT LUG DETAIL TYPE CC1254
SCALE 1:5
SIMILAR TO CC1400 LUG EXCEPT WHERE STATED
PROVIDE 4 OFF

GENERAL NOTES:

1. FOR STEELWORK NOTES REFER TO DRG 6010041-ME-003
2. FOR PAINTSPEC NOTES REFER TO DRG 6010041-ME-003

No	BY	DATE	DESCRIPTION	APPD
0	BKM	03/07/09	ISSUED FOR CONSTRUCTION	AC
A	ARB	29/06/09	ISSUED FOR CLIENT REVIEW	

Scale: AS NOTED

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DESIGNED	MG	CHECKED	PN
DRAWN	ARB	CHECKED	PAB
APPROVED	AC	DATE	08/07/09

Cad ref: J:\Projects\60100410\5 CAD\5.3 Working\60100410 002.dwg
Last modified: 08 Jul 09 - 16:09

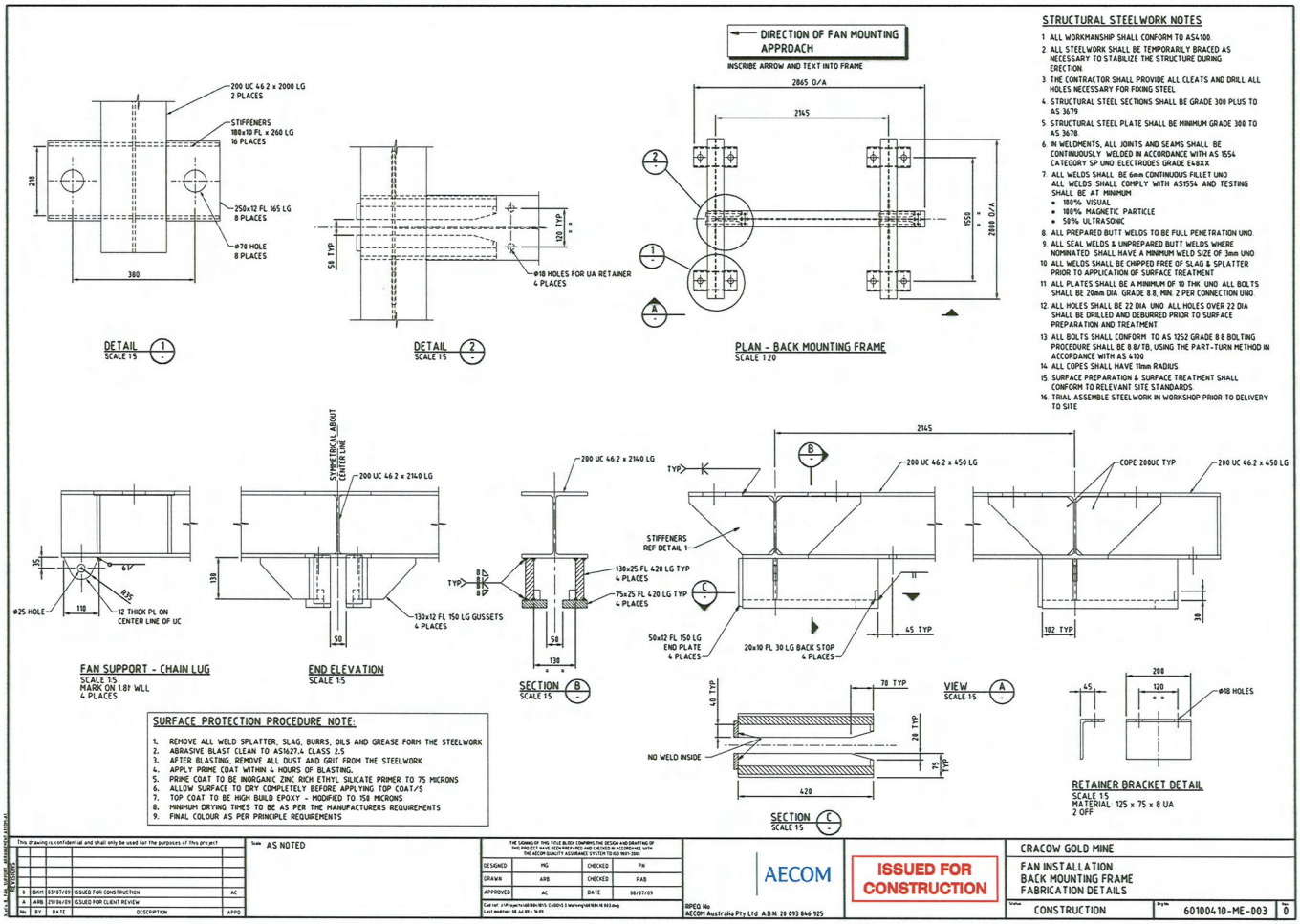
AECOM

RPEQ No
AECOM Australia Pty Ltd A.B.N. 20 093 846 925

ISSUED FOR CONSTRUCTION

CRACOW GOLD MINE
FAN INSTALLATION
FAN MOUNTING FRAME AND FAN SUPPORT LUGS
FABRICATION DETAILS

Status:
Dwg No: 60100410-ME-002
Rev: 0


DIRECTION OF FAN MOUNTING APPROACH
INSCRIBE ARROW AND TEXT INTO FRAME
200 UC 46.2 x 2000 LG 2 PLACES
STIFFENERS 180x10 PL x 260 LG 16 PLACES
250x12 FL 165 LG 8 PLACES
ø70 HOLE 8 PLACES
380
238
DETAIL 1 SCALE 1:5
58 TYP
120 TYP
ø18 HOLES FOR UA RETAINER 4 PLACES
DETAIL 2 SCALE 1:5
2865 O/A
2145
1550
2800 O/A
PLAN - BACK MOUNTING FRAME SCALE 1:20
STRUCTURAL STEELWORK NOTES
1. ALL WORKMANSHIP SHALL CONFORM TO AS4100.
2. ALL STEELWORK SHALL BE TEMPORARILY BRACED AS NECESSARY TO STABILIZE THE STRUCTURE DURING ERECTION.
3. THE CONTRACTOR SHALL PROVIDE ALL CLEATS AND DRILL ALL HOLES NECESSARY FOR FIXING STEEL.
4. STRUCTURAL STEEL SECTIONS SHALL BE GRADE 300 PLUS TO AS 3679.
5. STRUCTURAL STEEL PLATE SHALL BE MINIMUM GRADE 300 TO AS 3678.
6. IN WELDMENTS, ALL JOINTS AND SEAMS SHALL BE CONTINUOUSLY WELDED IN ACCORDANCE WITH AS 1554 CATEGORY SP UNO. ELECTRODES GRADE E48XX.
7. ALL WELDS SHALL BE 6mm CONTINUOUS FILLET UNO. ALL WELDS SHALL COMPLY WITH AS1554 AND TESTING SHALL BE AT MINIMUM
• 100% VISUAL
• 100% MAGNETIC PARTICLE
• 50% ULTRASONIC
8. ALL PREPARED BUTT WELDS TO BE FULL PENETRATION UNO.
9. ALL SEAL WELDS & UNPREPARED BUTT WELDS WHERE NOMINATED SHALL HAVE A MINIMUM WELD SIZE OF 3mm UNO.
10. ALL WELDS SHALL BE CHIPPED FREE OF SLAG & SPLATTER PRIOR TO APPLICATION OF SURFACE TREATMENT.
11. ALL PLATES SHALL BE A MINIMUM OF 10 THK UNO. ALL BOLTS SHALL BE 20mm DIA. GRADE 8.8, MIN. 2 PER CONNECTION UNO.
12. ALL HOLES SHALL BE 22 DIA. UNO. ALL HOLES OVER 22 DIA SHALL BE DRILLED AND DEBURRED PRIOR TO SURFACE PREPARATION AND TREATMENT.
13. ALL BOLTS SHALL CONFORM TO AS 1252 GRADE 8.8 BOLTING PROCEDURE SHALL BE 8.8/TB, USING THE PART-TURN METHOD IN ACCORDANCE WITH AS 4100.
14. ALL COPES SHALL HAVE 11mm RADIUS.
15. SURFACE PREPARATION & SURFACE TREATMENT SHALL CONFORM TO RELEVANT SITE STANDARDS.
16. TRIAL ASSEMBLE STEELWORK IN WORKSHOP PRIOR TO DELIVERY TO SITE.
SYMMETRICAL ABOUT CENTER LINE
200 UC 46.2 x 2140 LG
35
6V
ø15
ø25 HOLE
110
12 THICK PL ON CENTER LINE OF UC
FAN SUPPORT - CHAIN LUG SCALE 1:5 MARK ON 1.8t WLL 4 PLACES
138
50
130x12 FL 150 LG GUSSETS 4 PLACES
END ELEVATION SCALE 1:5
TYP
130x25 FL 420 LG TYP 4 PLACES
75x25 FL 420 LG TYP 4 PLACES
58
138
SECTION B SCALE 1:5
2145
TYP
200 UC 46.2 x 450 LG
STIFFENERS REF DETAIL 1
50x12 FL 150 LG END PLATE 4 PLACES
20x10 FL 30 LG BACK STOP 4 PLACES
45 TYP
COPE 200UC TYP
102 TYP
38
SURFACE PROTECTION PROCEDURE NOTE:
1. REMOVE ALL WELD SPLATTER, SLAG, BURRS, OILS AND GREASE FORM THE STEELWORK
2. ABRASIVE BLAST CLEAN TO AS1627.4 CLASS 2.5
3. AFTER BLASTING, REMOVE ALL DUST AND GRIT FROM THE STEELWORK
4. APPLY PRIME COAT WITHIN 4 HOURS OF BLASTING.
5. PRIME COAT TO BE INORGANIC ZINC RICH ETHYL SILICATE PRIMER TO 75 MICRONS
6. ALLOW SURFACE TO DRY COMPLETELY BEFORE APPLYING TOP COAT/S
7. TOP COAT TO BE HIGH BUILD EPOXY - MODIFIED TO 150 MICRONS
8. MINIMUM DRYING TIMES TO BE AS PER THE MANUFACTURERS REQUIREMENTS
9. FINAL COLOUR AS PER PRINCIPLE REQUIREMENTS
40 TYP
NO WELD INSIDE
70 TYP
28 TYP
75 TYP
420
SECTION C SCALE 1:5
VIEW A SCALE 1:5
45
200
120
ø18 HOLES
RETAINER BRACKET DETAIL SCALE 1:5 MATERIAL 125 x 75 x 8 UA 2 OFF
This drawing is confidential and shall only be used for the purposes of this project
REVISIONS
No | BY | DATE | DESCRIPTION | APPD
0 | BKM | 03/07/09 | ISSUED FOR CONSTRUCTION | AC
A | ARB | 29/06/09 | ISSUED FOR CLIENT REVIEW
Scale AS NOTED
THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED IN ACCORDANCE WITH THE AECOM QUALITY ASSURANCE SYSTEM TO ISO 9001:2000
DESIGNED MG CHECKED PH
DRAWN ARB CHECKED PAB
APPROVED AC DATE 08/07/09
Last Plotted: 08 Jul 09 - 14:09
AECOM
ISSUED FOR CONSTRUCTION
RPEQ No
AECOM Australia Pty Ltd A.B.N. 20 093 846 925
CRACOW GOLD MINE
FAN INSTALLATION
BACK MOUNTING FRAME
FABRICATION DETAILS
Status CONSTRUCTION
Drg No. 60100410-ME-003
Sht 1
0