WCB ENGINEERING BULLETIN

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The Institution of Certificated Mechanical and Electrical Engineers South Africa
Western Cape Branch (WCB)

SEPTEMBER 2020

MISSION STATEMENT: 1. To uphold the image and status of the Certificated Engineer. 2. To represent the Certificated Engineer at ECSA and other decision-making bodies concerning legislation, safety & health standards, the environment and the machinery regulations. 3. To promote continued education and training of its members and future engineers. 4. To promote fellowship in the engineering profession.

EDITORIAL

Welcome to the latest edition of the Western Cape News Bulletin

We trust that all members and families are enduring the current COVID pandemic and lockdown safely. It really is a tough time for the Country and Industry, where most of us are employed or contracted to, and all we can really do is to endure and take all precautions to ensure our Safety and Health.

In this Bulletin, we have a copy of an email from the Department of Labour concerning the GCC examinations for 2020 (copy of email content - attachments not included as not relevant to our members), followed by the normal Questions and Answers for Factories and Mining GCC examinations.
The continuation of the "Lighting up the fairest Cape 1895 to 1995" with part of the Appendix A which describes all the generation plants and machinery.

Please find the latest ECSA E-Bulletin here

Any contributions to future editions of this Bulletin from members would be welcome.

I trust that you will find the content of this news bulletin interesting enough to pass on to your colleagues and friends.

Chris Schnehage
chris@icmeewc.co.za

LOCAL BRANCH NEWS

Activities of the Western Cape Branch since the last Bulletin were as follows:

Due to the current Lock Down situation there has been no activity of the branch.
Hopefully we will be able to arrange meetings or visits soon again.

We appeal to members who have an interest to please suggest something and assist with arrangements.

Until next time, Ciao for now!

Chris Schnehage
Tel: 083 326 8023
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Subject: FW: GCC Factories Examinations

Good Day All

After Consultation with the Department of Higher Education and Training , the decision was taken that only one examination for the Government Certificate of Competency (Factories) will take place this year. The examination for both Plant engineering Factories-8190316 and Occupational Health and Safety Act- 13050046 will take place in November 2020. For those who already register to sit for June 2020 examination, you are encouraged to contact your respective colleges and make arrangements .

Kindly refer to the attached memo and revised Management Plan for the year 2020 from the Department of Higher Education and Training . For enquiries related to examination registrations , please contact your TVET Colleges .

For any other enquiries related to GCC , contact Mr Leema Mofokeng leema.mofokeng@labour.gov.za /066 566 1379 or Ms Matlala Sathekge matlala.sathekge@labour.gov.za /079 694 7488

Regards

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BREAKING NEWS FOR GCC CANDIDATES:

Due to the fact that COVID-19 is still a factor the Master Class for GCC candiddates cannot be held this year, however, Virtual sessions have been arranged by ICMEESA.

These sessions are scheduled as folllows:
Monday November 2 - Mechanical Engineering Part 1 - Zoom meeting. 18h00 to 19h30
Tuesday November 3 - Electrical Engineering Part 1 - Zoom meeting. 18h00 to 19h30
Wednesday November 4 - Mechanical Engineering Part 2 - Zoom meeting. 18h00 to 19h30
Thursday November 5 - Electrical Engineering Part 2 - Zoom meeting. 18h00 to 19h30

Friday November 6 - Department of Labour Presentation for all Candidates - 10h00 to 11h30

So at least there will be some guidance for candidates for the upcoming GCC examinations.

OHSAct, Nov. 2009 (2) (Act)

[2.1] When does an employer have duties to persons other than his employees and what are these duties? [2]

Answer: 9(1)
2.2 When does a self-employed person have duties to other persons and what are these duties? [2]

Answer: 9(2)

2.3 Whenever any of your employees does or omits to do any act which would be an offence in terms of the Act for you when you do or omit to do it, then, unless you can prove certain facts, you shall be presumed to have done or omitted to do that act and shall be liable to be convicted and sentenced in respect thereof.

2.3.1 What are these facts you must be able to prove? [5]

2.3.2 How does this requirement affect a contractor doing work for you on your premises? [1]

Answer: 37 (1) & (2)

Plant Eng. Nov. 2019 (7.2)

The electrically driven crab of an overhead crane can lift a mass load of 5 000 kg.
Its traversing speed is 0,375 m/s, its own mass is 2 500 kg.
The traversing drive has no mechanical break and depends solely on electrical breaking assisted by the resistance of the wheels on the track which can be taken as 1 350 N when the crab is fully loaded.

Calculate the maximum distance the crab travels when fully loaded if, because of power failure, there is no electrical breaking. The relevant features of the traversing drive are as follows:

Moment of inertia of motor armature: 0,04 kg m^2
Speed of motor: 950 rpm
Diameter of wheel: 250 mm

The wheels are driven by double-reduction gears with ratios of 18 to 110 and 15 to 82 and the gearing efficiency is 85%. [14]

Suggested answer:

Let linear deceleration $= a \ m/s^2$

Deceleration of wheel $= \dfrac{a}{0.125} = 8a$ rad/s^2

Gear Ratio $= \dfrac{110}{18} \times \dfrac{82}{15} = 33.4$ to 1

Deceleration of armature $= 33.4 \times 8a = 267a$ rad/s^2

Deceleration torque $= 0.04 \times 267a = 10.68a$ Nm

Torque on wheels neglecting gearing efficiency $= 10.68a \times 33.4 = 357a$ Nm

Force on wheel periphery $= \dfrac{357a}{0.125} = 2856a$ N

Since gearing provides a decelerating force, the required force on the wheel periphery to decelerate the armature is

$$= 2856a \times 0.85 = 2428a \text{ N}$$

Mass subject to linear deceleration $= 5\,000 + 2\,500 = 7\,500$ kg

Decelerating force $= 7\,500a$ N

Total decelerating force $= (7\,500 + 2\,428)a = 1\,350$ N

$$\therefore a = \frac{1\,350}{9\,928} = 0.136 \text{ m/s}^2$$

from: $v^2 = 2as$

$$s = \frac{v^2}{2a} = \frac{0.375^2}{2 \times 0.136} = \mathbf{0.517 \text{ m}}$$

Jorge Pereira GCC Preparation Classes (Pty) Ltd.
Part-time GCC classes in Cape Town
For details contact Jorge Pereira at
082 896 8489 or ***jorgepereira43@yahoo.co.za***

Plant Engineering: MINES mechanical question

Question

The following particulars apply to a 4-rope Koepe friction hoist mounted in a tower above the shaft:

length of each head and each tail rope	= 1 680 m
mass of head and tail ropes per metre	= 8,35 kg
mass of rock in skip	= 14 Mg
mass of each skip and attachments	= 24Mg
Angle of wrap of ropes on drum	= 180°
Coefficient of friction between drum and rope	= 0,3

Calculate the least possible distance in which the skips can be brought to rest when hoisting rock at 900 m/min. [10]

Proposed Solution:

4-Rope Koepe friction hoist

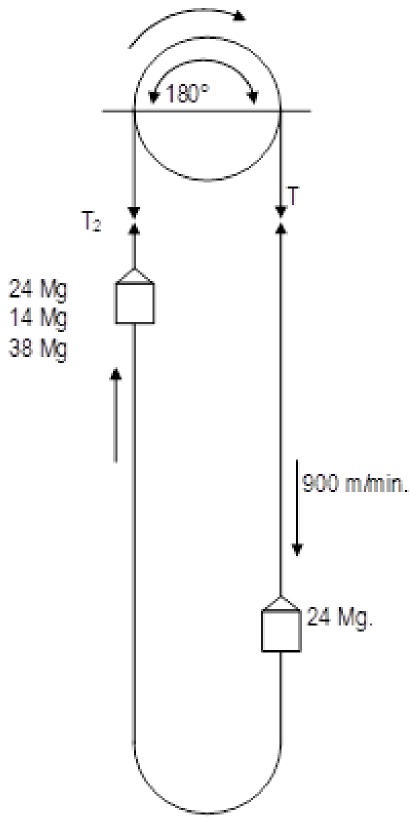
Total mass of rope on each side: $4 \times 1\,680 \times 8{,}35 = 56{,}1$ Mg

Total mass on up-going side: $14 + 24 + 56.1 = 94{,}1$ Mg

Total weight on down-going side: $24 + 56{,}1 = 80{,}1$ Mg

$$\frac{T_1}{T_2} = e^{\mu\theta} = 2.72^{0.3\pi} = 2.72^{0.94248} = 2.57$$

Let d = deceleration in m/sec^2



T_1 = 80,1 × 9,81 + 80,1 × d = 785,8 + 80,1d kN

T_2 = 94,1 × 9,81 – 94,1 × d = 923 – 94,1d kN

At the instant of slipping:

$$\frac{T_1}{T_2} = e^{\mu\theta} \quad \therefore\ 2.57 = \frac{785.8 + 80.1d}{923 - 64.1d}$$

$$\therefore\ 2\,372 - 241.8d = 785.8 + 80.1d$$

$$\therefore\ (241.8 + 80.1d = 2\,372 - 785.8$$

$$\therefore\ d = \frac{1\,586.2}{322} = \mathbf{4.9\ m.s^{-2}}$$

At a speed of 90 m/minute:

$$v = \frac{900}{600} = 15\ m.s^{-1}$$

v^2 = 2ds, where s = minimum distance for stopping

$$v^2 = 2ds \quad \therefore\ 15^2 = 2 \times 4.9s$$

$$\therefore\ s = \frac{15^2}{2 \times 4.9}$$

$$= \mathbf{22.96\ m}$$

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A Legal Knowledge: MINES question

Question (June 2019):

10. Every pressure vessel shall be provided with at least one safety valve. Name five requirements that the safety valve must comply to. [10]

Proposed answer:

(a) kept **locked, sealed or otherwise rendered inaccessible** to any unauthorised person;
(b) **set to open at or before reaching the maximum safe working gauge pressure;**
(c) such as to **prevent the pressure rising in excess of 10 per cent above the maximum safe working gauge pressure;**
(d) **attached to the pressure vessel and which shall be incapable of being shut off therefrom,** except where two or more pressure vessels with the same maximum safe working gauge pressure are connected to a common supply main, one safety valve fitted directly to the supply main, situated so that it is easily visible from any of the pressure vessels, shall be sufficient: Provided that where a pressure vessel is capable of being isolated from such common supply main, the Principal Inspector of Mines may require the fitting of a fusible plug or rupturing disc to such pressure vessel;

(e) **constructed of metal approved by the Principal Inspector of Mines**, provided that cast iron shall not be used if the maximum safe working gauge pressure of the pressure vessel is in excess of 1 megapascal; and

(f) **arranged to discharge by means of a pipe any dangerous or toxic gas, vapour or liquid so as not to endanger the safety of persons.**

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APPENDIX A

GENERATING PLANT DETAILS

RONDEBOSCH POWER STATION

The first public electricity supply system in the Cape Peninsula was founded by Edlin and Stevenson, the power station being established in 1892 “near the Outspan at the Westerford Bridge”, Rondebosch, apparently right on the Newlands boundary near the Dean Street corner.

2 of Steam engines.
Reciprocating type.
Marshall.
Each driving two dynamos.

4 of Dynamos, belt-driven.
Johnson and Phillips-Kapp.
11 kW, 220 V, three-wire, direct current.

Total installed generating capacity .... **44 kW**

In 1893 the municipal concessions were acquired by the Cape Town and Suburban Electric Lighting Syndicate and the direct current Rondebosch plant moved to another site in Electric Road, Wynberg,

New alternating current plant was then installed “at Rondebosch”. Evidently this was a new site in Rouwkoop Road, Rondebosch, the present site of the “Avondrust” elderly ladies home.

2 of Alternators, small.
Mordey.
Single-phase.

1 of Alternator, large.
Flywheel type.

This station was closed down, along with the Wynberg station, when the Claremont power station was commissioned in 1903.

WYNBERG POWER STATION

The following plant was moved here from the original Outspan site in Rondebosch in 1893.

2 of Steam engines.
Reciprocating type.
Marshall.
Each driving two dynamos.

4 of Dynamos, belt-driven.
Johnson and Phillips-Kapp.
11 kW, 220 V, three-wire, direct current.

Station total installed generating capacity .... **44 kW**

The following additional plant, which was referred to as a “single 440 V tandem self-balancing machine” was installed here in 1901, following the take-over of the Cape Town and Suburban Electric Lighting Syndicate by a new company, namely the Cape Peninsula Lighting Company Limited.

1 of Steam turbine-dynamo set.
C A Parsons and Co., UK.
Two dynamos, direct-coupled as a tandem set.
Each dynamo 25 kW, 220 V.

Total installed generating capacity .... 50 kW

Station total installed generating capacity .... **94 kW**

This tandem set was moved to Claremont in 1903, and the station then closed down, along with the Rondebosch station.

CLAREMONT POWER STATION

This station, built in Stegman Road near the railway line, was commissioned in 1903, being equipped initially with a "double current machine for 440 V D.C. and 3-phase A.C 60 cycles", plus the "440 V tandem self-balancing machine" from Wynberg, all as below.

The "double current" type of generator was quite fashionable at this time when there was a gradual transition taking place from direct current to alternating current generation. These machines were accordingly arranged so that they could act either as dynamos, supplying direct current, or as alternators, supplying alternating current, hence the name "double current".

1 of Turbo-alternator set.
C A Parsons and Co., UK.
135 kVA, 3 300 V, 60 Hz, three-phase.

2 of Steam turbine-generator sets.
C A Parsons and Co., UK.
Generators, direct-coupled.
Double current type.
135 kW, arranged for 440 V direct current.

Total installed generating capacity (about) .... 405 kW

The generating plants at the Rondebosch and Wynberg stations were then closed down, and the following "single 440 V tandem self-balancing machine" removed from Wynberg was installed here in 1903.

1 of Steam turbine-dynamo set.
C A Parsons and Co., UK.
Two dynamos, direct-coupled as a tandem set.
Each dynamo 25 kW, 220 V.

Total installed generating capacity .... 50 kW

Station total installed capacity .... **455 kW**

MUIZENBERG POWER STATION

2 of Steam engine-alternator sets.
Engines, reciprocating type.
Bellis-Westinghouse.
150 kW, 3 300 V, 50 Hz, three-phase.

2 of Coal-fired boilers.

Total installed generating capacity .... **300 kW**

This plant was installed in Muizenberg by the municipality of Kalk Bay in 1907, and the station officially opened on 3 August 1907. Although the station was initially referred to as the Kalk Bay power station, in later years it was more generally known as the Muizenberg power station because of its location, just off the present Baden Powell Drive near the traffic circle at Sunrise Beach.

It functioned as a power station and sewage pumping station until 17 February 1923, when the generating plant was shut down. After this date it acted as a distribution substation and sewage pumping station until 1935, when the substation was shut down and the sewage pumping station re-established in a new adjacent building, which still exists to this day. The old building was then demolished.

GRAAFF ELECTRIC LIGHTING WORKS

2 of Steam engines.
Reciprocating, vertical cross-compound type.
Kuhn, Stuttgart, Germany.
200 HP.

2 of Dynamos, shunt-wound, with external armatures.
Grämine-ring multipolar type.
Siemens and Halske, Germany.
150 kW.

2 of Pelton water-turbine wheels.
J.M.Voith, Würtemburg, Germany.
200 HP.

2 of Multi-tubular boilers.
Simonis and Lanz.
Frankfurt-on-Main, Germany.

Commissioned 1895

Station total installed capacity .... **300 kW**

The dynamos could be driven by means of either the water turbines or the steam engines, mounted at either end of the dynamos, selection being by means of special clutches.

Then three years later, further generating plant was installed, as below.

2 of Dynamos, rope driven.
General Electric Company, USA.
150 kW.

These dynamos were driven by ropes from the existing steam engines. This arrangement enabled the whole of the steam plant to be used in conjunction with the available water power.

Commissioned 1898

Station total installed generating capacity .... **600 kW**

The steam plant at Molteno was shut down for good on 29 January 1904, leaving only the water turbines to drive the dynamos. All generating plant was finally shut down in August 1920, the plant then being "available for disposal". The tall brick chimney stack, that had not been used since 1904, was only demolished some two years later, in 1922. The building today still houses electrical equipment and serves as a neighbourhood substation.

DORP STREET POWER STATION

1 of Steam engine-dynamo set.
Engine, reciprocating type.
Double-crank, single-acting, high-speed, compound type.
Bumpsted and Chandler.
200 HP.

Dynamo, direct-coupled.
Two-pole, high-speed type.
Crompton.
150 kW.

2 of Steam balancer sets.
50 HP.

2 of Locomotive type boilers.
Clayton and Shuttleworth, Hyde, UK.

Commissioned 1898

Total installed engine capacity .... 300 HP

Total installed generating capacity (about) .... **225 kW**

The 200 HP engine and 150 kW dynamo set was moved to the new Dock Road power station early in 1904, "after the Christmas load". On 17 February 1904, the 50 HP sets were shut down and disposed of soon afterwards.

DOCK ROAD (Temporary Wood and Iron Shed)

2 of Steam engine-generator sets.
Engines, reciprocating type.
Vertical, high-speed, tandem compound, enclosed type.
Sisson and Company, Gloucester, UK.
500 BHP.
Generators, direct-coupled.
Double current type.
Johnson and Phillips, London.
350 kW.

4 of Boilers.
Coal-fired, dry-backed, return-tube type.
Davey, Paxman and Co., UK.
Latest "Economic" type.
7 500 pounds of steam per hour at 150 psig and 212°F (100°C).

These four boilers were later moved to the new power station in Dock Road.

Commissioned 1900

Total installed engine capacity .... 1 000 HP

Total installed generating capacity .... **700 kW**

A few years later the capacity of this temporary station was increased by the addition of a further steam engine-dynamo set, as below.

1 -of Steam engine-dynamo set.
Engine, reciprocating type.
Three-crank, triple-expansion type.
Bellis and Morcom.
450 HP.
Dynamo, direct-coupled.

Six-pole type.
Mather and Platt.
300 kW.

Commissioned 1903

This latter unit was later removed from the temporary shed and installed in the new permanent Dock Road power station early in 1904.

Station total installed engine capacity .... 1 450 HP

Station total installed generating capacity .... **1 000 kW**

THE CENTRAL ELECTRIC LIGHT STATION

First Stage (1904)

1 of Steam engine-dynamo set.
Engine, reciprocating type.
Two-crank, single-acting, high-speed, compound type.
Bumpsted and Chandler.
200 HP.
Dynamo, direct-coupled.
Two-pole type.
Crompton.
150 kW.

The above set was moved here from Dorp Street.

1 of Steam engine-dynamo set.
Engine, reciprocating type.
Three-crank, triple-expansion type.
Bellis and Morcom.
450 HP.
Dynamo, direct-coupled.
Six-pole type.
Mather and Platt.
300 kW.

The above set was moved here from the temporary shed in Dock Road.

2 of Steam engines-dynamo sets.
Engines, reciprocating type.
Cross-compound type.
Ferranti Ltd.
1 000 HP.
Dynamos, direct-coupled.
Ten-pole type.
English Electric Manufacturing Company, UK.
Dick Kerr and Company.
700 kW.

4 of Boilers.
Hand-fired, dry-backed, return-tube type.
Davey Paxman and Co., UK.
Latest "Economic" type.
7 500 pounds of steam per hour at 150 psig.

These boilers were moved here from the temporary shed in Dock Road.

2 of Boilers.
Water-tube type, with economisers and superheaters.
20 000 pounds of steam per hour at 160 psig.

Eventually all the land-based boilers were replaced over a period by eight Babcock and Wilcox marine-type boilers with a total rated output of 239 000 pounds of steam per hour at a pressure of 220 psig.

Station total installed engine capacity .... 2 650 HP

Station total installed generating capacity .... **1 850 kW**

The station was formally opened by the Mayor, Mr W Thorne, on 14 April 1904.

Extension No.1 (1909)

2 of Steam engine-alternator sets.
Engines, reciprocating type.
Bellis-Siemens.
400 kW (525 HP), 2 200 V, two-phase.

These sets were installed primarily to meet the alternating current requirements of the Railway and Harbour Departments. They were apparently three-phase sets but wound specially for two-phase operation, evidently to permit supply to the government single-phase systems that had just been taken over.

With the installation of these two sets alternating current generation was introduced to the City for the first time.

Station total installed engine capacity .... 3 700 HP

Station total installed generating capacity .... **2 650 kW**

The four Davey Paxman hand-fired boilers were removed and replaced with new Babcock and Wilcox chain-grate stoker-fired boilers of the same pressure, along with a single tall brick chimney stack in 1908.

Extension No.2 (1912)

In 1912 the 150 kW Bumpsted and Chandler set, moved here in 1904 from Dorp Street, was in the process of being removed to make way for the following new 1 700 kW turbo-alternator set.

1 of Turbo-alternator set.
Apparently Curtis type turbine.
British Thomson-Houston, UK.
1 700 kW (2 300 HP), 11 000 V, three-phase.

Commissioned .... June 1913

This was the first turbo-alternator installed by the City. The new 11 000 V three-phase system was soon to become the standard that is still in use today.

This set remained in service until around 1925 when it was removed and stored in the Claremont substation prior to sale. Although in good working order it was no longer of value because of its small size and low efficiency. Incidentally, the removal of this set, along with the removal of another similar 1 700 kW BTH set installed around 1914, provided space to install a third and last 7 500 kW Metropolitan Vickers set in 1927.

Station total installed engine capacity .... 6 000 HP

Station total installed generating capacity .... **4 350 kW**

Extension No.3 (1913)

1 of Turbo-alternator set.
Apparently Curtis type turbine.
British Thomson-Houston, UK.
1 700 kW (2 300 HP), 11 000 V, three-phase.

Commissioned (about) .... June 1914

This set remained in service until around 1925 when it was removed and stored in the Claremont substation prior to sale. Although in good working order it was no longer of value because of its small size and low efficiency. The removal of this set, along with the removal of another similar 1 700 kW BTH set installed around 1914, provided the space to install a third and last 7 500 kW Metropolitan Vickers set in 1927.

Station total installed engine capacity .... 8 300 HP

Station total installed generating capacity .... **6 050 kW**

A further large Babcock and Wilcox boiler, with mechanical stoker, was installed during the year.

Two new Babcock and Wilcox marine-type land boilers were commissioned in October 1915. Each boiler was rated at 15 000 pounds of steam per hour at a pressure of 160 psig. With the installation of these new boilers it became possible to take the other land based boilers off the range for cleaning.

A motor convertor set was installed in 1914, evidently the No.2 set.

New coal and ash handling plant was commissioned in November 1916.

Extension No.4 (1918)

1 of Turbo-alternator set.
Apparently a Curtis type turbine.
British Thomson-Houston, UK.
3 000 kW (4 000 HP), 11 000 V, three-phase.

Commissioned .... towards end of 1917

The two Bellis-Siemens 400 kW 2 200 V two-phase sets were still operational at the end of 1917, but by the end of 1918 they had been removed and sold to the municipality of East London.
A new 1 000 kW convertor, No.3, was installed about the end of 1917.

By the end of 1918 this then left operational one 3 000 kW (BTH) and two 1 700 kW (BTH) turbo-alternators, along with two 700 kW (Ferranti) and one 300 kW (Bellis) engine-driven dynamos.

Station total installed engine capacity .... 11 050 HP

Station total installed generating capacity .... **8 100 kW**

One of the 1 700 kW units was kept in reserve because of blade deterioration, limiting useful output to 6 400 kW. Replacement blading was on order in 1917. The set was run at full load on one occasion in 1918 when it failed completely and was taken out of service. The following was the position at the end of 1918.

Station total installed engine capacity .... 8 750 HP

Station total installed generating capacity .... **6 400 kW**

During 1917 a new Babcock and Wilcox marine-type boiler was delivered and erected, but only commissioned early in 1918.

The following year, in February 1919, this new 3 000 kW alternator burnt out. One of the 1 700 kW machines was also out of commission at the same time due to complete failure of the turbine blading. This reduced the plant available for service, the position at the end of 1919 being as follows.

Station total installed engine capacity .... 4 750 HP

Station total installed generating capacity ....**3 400 kW**

Extension No.5 (1921)

1 of Turbo-alternator set.
Apparently a Curtis type turbine.
British Thomson-Houston, UK.
3 000 kW (4 000 HP), 11 000 V, three-phase.

Commissioned .... July 1921

Station total installed engine capacity .... 15 050 HP

Station total installed generating capacity ....**11 100 kW**

One of the Ferranti 700 kW sets was removed and sold as scrap. The 150 kW Bellis engines were removed and stored at Claremont pending being offered for sale as running units.

Removal of these sets made room for the installation of a new 7 500 kW Metropolitan Vickers turbo-alternator set, which was delivered and partially erected by the end of the year.

2 of Boilers.
Marine-type, with balanced draught, mechanical stokers.
Babcock and Wilcox.
35 000 pounds of steam per hour.

Commissioned: first unit .... September 1920
second unit .... February 1921

Two older land type boilers were removed to make room for these two new boilers, and then sold.

Apparently another old land type boiler was removed and a further new Babcock and Wilcox 35 000 pounds per hour boiler was installed and commissioned in July 1922.
By now all the old 20 000 pounds per hour boilers had been removed, which permitted the station steam pressure to be raised from the previous 175 psig to 220 psig in 1922.

Extension No.6 (1923)

1 of Turbo-alternator set.
Metropolitan Vickers, UK.
7 500 kW (10 000 HP), 12 000 V, three-phase.

To make room for this set the remaining 700 kW Ferranti engine-driven dynamo set was shut down, removed and sold as scrap. By this time all the other earlier reciprocating engine-driven sets had also been disposed of to make room for the more modern turbo-alternator plant now being installed.

Station total installed engine capacity .... 22 600 HP

Station total installed generating capacity ....**16 900 kW**

Extension No.7 (1926)

1 of Turbo-alternator set.
Metropolitan Vickers, UK
7 500 kW (10 000 HP), 12 000 V, three-phase.

Station total installed engine capacity .... 32 600 HP

Station total installed generating capacity ....**24 400 kW**

Extension No.8 (1927)

1 of Turbo-alternator set.
Metropolitan Vickers, UK
7 500 kW (10 000 HP), 12 000 V, three-phase.

This set was installed on the site of the first two 1 700 kW British Thomson- Houston sets which were shut down and removed to the Claremont substation before being sold. This turbo-alternator was the last generating set to be installed at the Dock Road power station.

The remaining operational sets were the two 3 000 kW British Thomson-Houston sets and the three 7 500 kW Metropolitan Vickers sets.

2 of Boilers.
Water-tube type.
each 50 000 pounds steam per hour.

These two boilers were installed in the space originally intended for, and at one time used as, a coal store.

Station total installed engine capacity .... 38 000 HP

Station total installed generating capacity ....**28 500 kW**

Appendix A part 2 in next edition...