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Attention: **Muhammad Ali**  
SRG Global

**SURVEY METHODOLOGY****COV-TEN-CON 514 stack raise works**

G'day Muhammad,

Below is an outline of the proposed survey methodology to be used onsite.

Survey instrument used is a Leica Nova MS50.

Accuracy Hz and Vertical 1"

Distance accuracy of 1 mm + 1.5 ppm. (prism and reflective strip)

Distance accuracy of 2 mm + 2 ppm. (any surface)

Site datum's as per marked up existing control onsite and as shown onsite by Covalent Supervisor.

Coordinate other local targets to enable survey works. (+/-1mm)

**COV-TEN-CON 514****Stack Flange Replacement T1 & T2****Hold Point 3.1**

Coordinate instrument by 3 point resection (+/-1mm)

Measure to existing stack surface and move cross hairs vertically till correct RL is achieved. (12.121mRL)

Instructed SRG to mark this point

Repeat for another mark for the cut line

**Hold Point 4.3**

Coordinate instrument by 3 point resection (+/-1mm)

Have SRG hold a prism on the flange surface to check the level and RL (+/-1mm)

Have SRG hold a prism in each bolt hole and check the orientation to design

COV-TEN-CON 514

**Stack Removal and Installation T1 & T2**

Hold Point 5.1

Coordinate instrument by 3 point resection (+/-1mm)

Measure base of existing stack and calculate the center position (+/-2mm)

Measure the outside surface (at 3 locations) of the new stack at nominated stages (RL) and calculate the center (+/-2mm) and compare to the base center point

Hold Point 5.2

Coordinate instrument by 3 point resection (+/-1mm)

Measure the outside surface (at 3 locations) of the new stack (top RL) and calculate the center (+/-2mm) and compare to the base center point

COV-TEN-CON 514

**Module Structural Steel Assembly T1 & T2**

Hold Point 3.1

Coordinate instrument by 3 point resection (+/-1mm)

Measure to u/s base plates and record RL for 3 columns of Module 1 (+/-1mm)

Hold Point 3.5

Measure the base and top of each column to adjust the verticality (north/south and east/west) (+/-2mm)

Measure the base at 3 locations for each column to calculate the base center of Module 1 (+/-2mm)

Measure the top at 3 locations for each column to calculate the top center of Module 1

Compare the top position to the base position

Calculate the center-center distances for each column at the top and compare to design (10m)

Adjust column's until within acceptable tolerance

Have SRG hold a prism atop each column and record the RL. Calculate shims. (+/-1mm)

Hold Point 4.3

Setup instrument and record level on top of each beam

SRG to install shims to level top of beams (+/-1mm)

Hold Point 5.2

Mark up the base of each column for center observations

Setup instrument and check the level on top of each column laying horizontally along entire length

Ensure each column is rotated so flanges horizontal

Mark up the top of the 2 straight columns whilst laying flat

Setup instrument and align to 1 column on the ground

Measure to the other column and have SRG adjust for alignment and spread (+/-2mm)

Hold Point 5.3

Setup instrument and measure the base marks for each column for the base/top (+/-2mm)

Calculate the center – center distances and compare to design

Calculate the alignment and height for the third column at the base/top and compare to design

Have SRG adjust the third column

Hold Point 5.5

Not possible as Module when upright isn't vertical.

Hold Point 5.6

Once Module 2 upright, setup instrument and measure the base/top at 3 locations for each column  
Calculate the center – center distances and compare to design (+/-2mm) (10m base / 7.334m top)

Hold Point 6.2

Mark up the base/top of each column for center observations  
Setup instrument and check the level on top of each column laying horizontally along entire length  
Ensure each column is rotated so flanges horizontal  
Mark up the top of the 2 straight columns whilst laying flat  
Setup instrument and align to 1 column on the ground  
Measure to the other column and have SRG adjust for alignment and spread (+/-2mm)

Hold Point 6.3

Setup instrument and measure the base marks for each column for the base/top (+/-2mm)  
Calculate the center – center distances and compare to design  
Calculate the alignment and height for the third column at the base/top and compare to design  
Have SRG adjust the third column

Hold Point 6.5

Not possible as Module when upright isn't vertical.

Hold Point 6.6

Once Module 3 upright, setup instrument and measure the base/top at 3 locations for each column  
Calculate the center – center distances and compare to design (7.334m base / 5m top)

COV-TEN-CON 514

**Assembled Modules Installation T1 & T2**

Hold Point 2.1

Mark up the base/top of each column for center observations  
Setup instrument and measure the base marks for each column for the base/top +/-2mm  
Calculate the center – center distances and compare to design  
Calculate the alignment and height for the third column at the base/top and compare to design

Hold Point 4.1

Have SRG hold a prism atop each column already erected and record the RL. Calculate shims (+/-1mm)

Hold Point 6.1

Measure the top at 3 locations for each column to calculate the top center of the Module  
Compare center top of the Module to base center of Module 1 and adjust if necessary  
Accuracy to achieve is 25mm/50m structure to 38mm/100m structure

Kind regards



Chris John

## BE Surveys