Australian Government
Department of Industry, Science and Resources

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 6/14B/21

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the instruments herein described.

CBH Model CBH-DTAW1 Discontinuous Totalising Automatic Weighing Instrument

submitted by Co-Operative Bulk Handling Limited
30 Delhi Street
West Perth WA 6005

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

This approval has been granted with reference to document NMI R 107, *Discontinuous Totalising Automatic Weighing Instruments (Totalising Hopper Weighers)*, dated July 2004.

This approval is subject to review at the decision of the Chief Metrologist in accordance with the conditions specified in the document NMI P 106.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern and variants 1 and 3 provisionally approved – interim certificate issued (variant 3 was variant 2 at that time)	30/07/14
1	Pattern and variants 1 to 3 approved – certificate issued.	25/09/14
2	Variant 4 approved – certificate issued	5/10/17
3	Variant 2 amended (load cells and indictors replaced) – certificate issued	10/08/20
4	Variant 5 approved – certificate issued	24/10/22

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with approval number 'NMI 6/14B/21' and only by persons authorised by the submittor.

Instruments purporting to comply with this approval and currently marked 'NMI P6/14B/21' may be re-marked 'NMI 6/14B/21' but only by persons authorised by the submittor.

It is the submittor's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with document NMI P 106.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificates of Approval No S1/0/A or No S1/0B.

The values of the performance criteria (maximum number of scale intervals etc.) applicable to the instrument shall be within the limits specified herein and in any approval documentation for the components where they are approved separately.

This approval shall NOT be used in conjunction with General Certificate of Approval No 6B/0.

Signed by a person authorised by the Chief Metrologist to exercise their powers under Regulation 60 of the *National Measurement Regulations 1999*.

Darryl Hines
Manager
Policy and Regulatory
Services

TECHNICAL SCHEDULE No 6/14B/21

1. Description of Pattern

provisionally approved on 30/07/14
approved on 25/09/14

A CBH model CBH-DTAW1 Class 0.2 discontinuous totalising automatic weighing (DTAW) instrument (Figures 1 and 2 – Note: The Figures may relate to variants rather than the pattern) having a weigh hopper of 12 000 kg maximum capacity.

The instrument is installed in a permanently fixed location.

Note: This approval has been granted with reference to document NMI R 107, *Discontinuous Totalising Automatic Weighing Instruments (Totalising Hopper Weighers)*, dated July 2004. The following description is intended to introduce terms used in this Certificate and Technical Schedule which may be additional to those in that document but which are consistent with the terminology in the document.

The system aims to provide a *bulk load delivery* using a particular automatic *delivery sequence* (the term 'delivery' may also be taken to refer to 'receipt').

This sequence involves the totalisation of the results of a number of *discrete load deliveries* or *weighing cycles*, each of which involves the division of the bulk product into *discrete loads*, according to a *target discrete load* the mass of which is then determined by weighing to give the *discrete load delivered* following which the product is discharged to the bulk output. Note that the *target discrete load* may be achieved by stopping or slowing the bulk product delivery prior to the *target discrete load* value being reached according to *discrete load target shutoff adjustments* (such as inflight adjustments or slow flow pre-sets).

Each *discrete load delivered* is totalised (at any time this may be termed the *cumulative totalisation*).

The *target discrete load* is generally a pre-selected value that is the same for most of the *discrete load deliveries* (this may be termed the *pre-selected target discrete load*). However for the final one or two deliveries in the *bulk load delivery* the *target discrete load* may differ (for example to avoid excessively large or small *discrete loads*). In addition, arrangements for stopping or slowing the bulk product delivery prior to the *target discrete load* value being reached may vary for the final discrete deliveries in the delivery sequence according to *target totalised load shutoff adjustments* (such as inflight adjustments or slow flow pre-sets).

The *totalised bulk load delivered* may be intended to be close to a requested amount (*target totalised load*) in which case adjustments and pre-sets as described above may be used to achieve this as closely as possible.

Alternatively the *totalised bulk load delivered* may be the quantity measured without a particular target totalised load.

The *totalised bulk load delivered* is the cumulative totalisation (sum of all discrete loads delivered), in the complete *bulk load delivery*. The transaction is based on the *totalised bulk load delivered* (not the *target totalised load*).

1.1 Details

The CBH-DTAW1 instrument is a Class 0.2 discontinuous totalising automatic weighing instrument having a weigh hopper with a maximum capacity of 12 000 kg.

The instrument is approved for use with a minimum totalised load (Σ_{min}) of not less than 50 000 kg and a totalisation scale interval of 5 kg. The instrument is set to have a *target discrete load* of from 9 000 to 10 000 kg.

The CBH-DTAW1 instrument permanently records the *totalised bulk load delivered* and the net value of each discrete load delivered. This information can be sent to a printer if required.

Note: The discrete load values are NOT approved for trade use. The totalised bulk load delivered (a total of the discrete load delivered values) is the value approved for trade use.

1.2 Weighing System

The pattern (Figures 1 to 6 – Note: The Figures may relate to variants rather than the pattern) comprises components as described below.

(*) For items marked (*) below, 'Compatible and Equivalent' equipment may be used. 'Compatible and Equivalent' refers to equipment of the same or better specifications, requiring no changes to software for satisfactory operation of the complete system including all checking facilities.

(a) A weigh bin hopper with out-feed gate, using four Avery Weigh-Tronix Ltd model 8708 load cells of 7000 kg maximum capacity (the load cells are also described in the documentation of approval NMI S176B, and are mounted in accordance with that documentation). The load cells are located symmetrically around the weigh bin hopper.

(b) A Rinstrum model R420 digital indicator for the weighing system (the digital indicator is also described in the documentation of approval NMI S463).

(c) A Schneider Electric model Modicon 140CPU65260 (*) programmable logic controller (PLC).

(e) Matrixgroup BULKmetrix (version 5.4.1 software) which runs on the programmable logic controller mentioned in (c) above, and utilises the weight readings from the digital indicator to determine the discrete load values and totalises them to determine the *totalised bulk load delivered*, and stores the weighing data.

(d) An operator interface computer by which the operator can control the system, and access the weighing data.

Note: The system may also be controlled and weighing data accessed by other (networked) computers.

(f) A printer (to print transaction data), or equivalent record in electronic form.

(g) Actuators and associated position sensors to control the product in-feed and the out-feed gates for the weigh bin.

The system is designed to ensure retention of metrological information in the event of a power failure, including transition to an emergency power supply if necessary for this purpose.

1.3 Indicator and PLC Control

The BULKmetrix software running on the PLC, along with weight data from the digital indicator, controls the weighing sequence, including checking of various aspects of the system operation (blocked chutes, gates open or closed as appropriate) and filling of the weigh-bin by starting and stopping of product flow (opening and closing of in-feed

and out-feed gates) according to messages from the plant operator's control system.

The BULKmetrix software running on the PLC, uses inputs from the system to determine when no further product delivery is required (e.g. when the in-feed bin is empty, the out-feed bin is full, or sufficient product has been supplied). In some cases these inputs may be provided by the plant operator's control system (e.g. to indicate that sufficient product has been supplied).

Weight data from the digital indicator is continually provided to the BULKmetrix software which uses this information to determine the discrete load values, totalise them to determine the *totalised bulk load delivered*, and store this weight data.

Where sufficient product has been supplied, the BULKmetrix software finalises the delivery and totalises the discrete load deliveries to form the *total bulk load delivered* value.

The weight data, together with information regarding the weighing sequence status, is also provided continually to the operator interface computer(s). The operator interface computer(s) can retrieve weight data for printing if required.

Note: The operator interface may combine information relating to a number of CBH-DTAW1 instruments as shown in Figure 4.

1.4 Operation

An overview of the sequence of operation of the system is shown in Figure 6.

The system is considered to be a discontinuous totalising automatic weighing instrument as it follows a predetermined program of automatic processes characteristic of the instrument. The product is weighed by individual discrete loads, which are totalised to determine the bulk product weighed.

(a) Initially the target discrete load ('batch target') is set in the PLC (generally this will be a fixed value and will not vary between deliveries). The target discrete load may be programmed to different values for different grain types due to the volume of the grain.

The system remains in an idle state until a start signal is received and valid shipping information is set by the operator. When the system receives a start signal from the plant operator an initial check of the system is carried out. (gates are closed, air pressure OK, grain in upper garner, etc).

(b) The system will commence filling the weigh hopper via the fast and slow feed gates until the target discrete load value is reached. The status of the Start Signal from the plant operator's control system is also monitored as absence of this signal will indicate that product is not available for measurement, in which case the set-point cannot be reached, and the delivery will be finalised.

(c) Once the weigh bin is full (or no further product is available) and the feed gates are closed, the system waits for a stable weight signal, and records the gross weight reading for the loaded weigh bin.

(d) The system checks the status of alarms and inputs and then discharges the product into the lower garner. When the weigh bin is empty, the discharge gates are closed and when the weight reading is stable, the system records the empty ('tare') weight reading for the empty bin.

(e) The gross weight value for the loaded bin at (c), minus the tare weight value for the empty bin at (d) is the discrete load delivered from the weigh bin. This can then be added to values of previous cycles to provide a cumulative totalised

load.

(f) If the Start Signal is present – indicating that further product is required, and there are no faults or alarms present – the system will repeat the sequence from (b) to (e).

(g) If the quantity of product required to reach the target totalised load ('shipping target') is less than three times the target discrete load, the system will recalculate the value for each remaining discrete load to avoid attempting to weigh less than the minimum capacity in one cycle. On the final cycle, a small amount of product will be fed into the weigher using the jog function to enable the shipping target totalised load to be reached as closely as possible.

(h) The gross, tare and net weight for each weighing cycle are permanently recorded along with a running total of the product weighed. Various reports are available to print.

1.5 Verification Provision

Provision is made for the application of a verification mark.

1.6 Sealing Provision

The digital indicator shall be sealed as described in the documentation of its approval (see 1.2(b) above).

1.7 Markings and Notices

(a) Instruments carry the following markings, grouped together in a clearly visible place on the instrument, either on a descriptive plate fixed near the indicating device or on the indicating device itself:

Manufacturer's mark, or name written in full	Co-Operative Bulk Handling Limited
Indication of accuracy class	0.2
Pattern approval mark for the instrument	6/14B/21
Model number	CBH-DTAW1
Serial number of the instrument	.....
Maximum capacity	*Max* = 12000 kg *
Minimum capacity	*Min* = 5000 kg *
Minimum totalised load	Σ_{min} = 50000 kg *
Totalisation scale interval	d_t = 5 kg
Material to be measured	.....

(*) These markings shall also be shown near the display of the result if they are not already located there.

(b) Instruments carry a notice visible to the operator stating TARGET DISCRETE LOAD SHALL BE 9000 kg to 10000 kg ONLY, or similar wording.

Note: Markings for variants vary according to particular characteristics.

2. Variant 1 — provisionally approved on 30/07/14 approved on 25/09/14

The pattern or variants with a number (up to 4) of weigh bin / indicators controlled simultaneously by the one PLC running Bulkmetrix software, and with an operator interface screen controlling and accessing data relating to all weigh bin / indicators.

Each weigh bin / indicator shall be treated as a separate discontinuous totalising automatic weighing instrument for verification purposes, and markings specific to each shall be provided with clear identification of the weigh bin / indicator concerned (e.g. 'Weigher 1', 'Weigher 2' etc.

3. Variant 2 **approved on 25/09/14**
amended on 10/08/20

The following model CBH-DTAW1 instruments, which are similar to the pattern, but which use alternative indicator and load cell models, have differing numbers of load cells, and differing capacities and parameters.

These instruments are based on modification of earlier instruments to utilise the Schneider Electric PLC and BULKmetrix control equipment. Consequently the load cells and indicators mentioned may not have current NMI supplementary certificates, they may nevertheless be used in these instruments.

a) Location: Kwinana, WA (Weighers 1, 2, 3 & 4)
Load cells: A&D LCC11T010-K of Emax = 10000 kg
NMI S410 (4 cells used)
Indicator: Rinstrum C520, NMI S719
Class 0.2
Max = 15000 kg
Min = 5000 kg
Σ_{min} = (no less than) 60000 kg
d_t = 5 kg
TARGET DISCRETE LOAD SHALL BE 9500 kg to 12000 kg ONLY

b) Location: Albany, WA (Weighers 1 & 2)
Load cells: A&D LCC11T010-K of Emax = 10000 kg
NMI S410 (4 cells used)
Indicator: Rinstrum C520, NMI S719
Class 0.2
Max = 15000 kg
Min = 5000 kg
Σ_{min} = (no less than) 60000 kg
d_t = 5 kg
TARGET DISCRETE LOAD SHALL BE 8500 kg to 12000 kg ONLY

c) Location: Esperance, WA (Weigher 1)
Load cells: Flintec model SB5 of Emax = 5000 kg (4 cells used)
Indicator: Rinstrum C520, NMI S719
Class 0.2
Max = 10000 kg
Min = 5000 kg
Σ_{min} = (no less than) 50000 kg
d_t = 5 kg
TARGET DISCRETE LOAD SHALL BE 8000 kg to 9000 kg ONLY

d) Location: Esperance, WA (Weigher 2)
Load cells: Flintec model SB5 of Emax = 5000 kg (4 cells used)
Indicator: Rinstrum C520, NMI S719
Class 0.2
Max = 12000 kg
Min = 5000 kg
Σ_{min} = (no less than) 50000 kg
d_t = 5 kg
TARGET DISCRETE LOAD SHALL BE 8000 kg to 10000 kg ONLY

e) Location: Geraldton, WA (Weighers 1 & 2)
Load cells: Zemic model BM24R of Emax = 5000 kg (4 cells used)
Indicator: Rinstrum C520, NMI S719
Class 0.2
Max = 10000 kg
Min = 5000 kg
Σ_{min} = (no less than) 50000 kg
d_t = 5 kg
TARGET DISCRETE LOAD SHALL BE 8000 kg to 9000 kg ONLY

f) Location: Forrestfield, WA (Weigher 4)
Load cells: Global Weighing PR6201/53C3 of Emax = 5000 kg
NMI S333 (4 cells used)
Indicator: Toledo model Panther, NMI S353
Class 0.2
Max = 10000 kg
Min = 5000 kg
Σ_{min} = (no less than) 50000 kg
d_t = 5 kg
TARGET DISCRETE LOAD SHALL BE 9000 kg ONLY

g) Location: Forrestfield, WA (Weighers 1, 2 & 3)
Load cells: Sartorius PR6246/32C3 of Emax = 300 kg
NMI S350 (3 cells used)
Indicator: Toledo model Panther, NMI S353
Class 0.2
Max = 400 kg
Min = 200 kg
Σ_{min} = (no less than) 2000 kg
d_t = 0.2 kg
TARGET DISCRETE LOAD SHALL BE 300 kg ONLY

4. Variant 3 **provisionally approved on 30/07/14**
approved on 25/09/14

The pattern or variants as Class 0.5, 1 or 2 discontinuous totalising automatic weighing instruments (DTAWI), otherwise having parameters and characteristics as described for the particular pattern or variant.

5. Variant 4 approved on 5/10/17

Variant 2 using an alternative Rinstrum model C520 digital indicator which is also described in the documentation of approval NMI S719.

The sealing arrangements are described in the documentation of approval NMI S719.

6. Variant 5 approved on 24/10/22

The pattern or variants having the Citect Supervisory Control and Data Acquisition (SCADA) software running on the Server and in lieu of BULKmetrix SCADA software. The Citect SCADA software interfaces with the software running of the PLC.

The system operation is as described for the pattern in clause **1.4 Operation** and remains unchanged. The operator control interface screen and generated report forms are as shown in Figures 7 and 8.

The software version number is designated Citect SCADA Version xx.xx Update yy. Version shall be 8.20 or greater and Update shall be 13 or greater.

The instructions for accessing the software version and numbers are as follows:

- Hit the Windows key on the keyboard.
- Click on the ^ on the system tray.
- Click on the Runtime Manager (Service Mode).
- The software version and numbers are displayed as shown in Figure 9.

TEST PROCEDURE No 6/14B/21

Instruments shall be tested in accordance with any relevant tests specified in the applicable National Instrument Test Procedures for this category of instrument.

Where an applicable National Instrument Test Procedure does not exist, a copy of an appropriate test procedure should be requested from NMI.

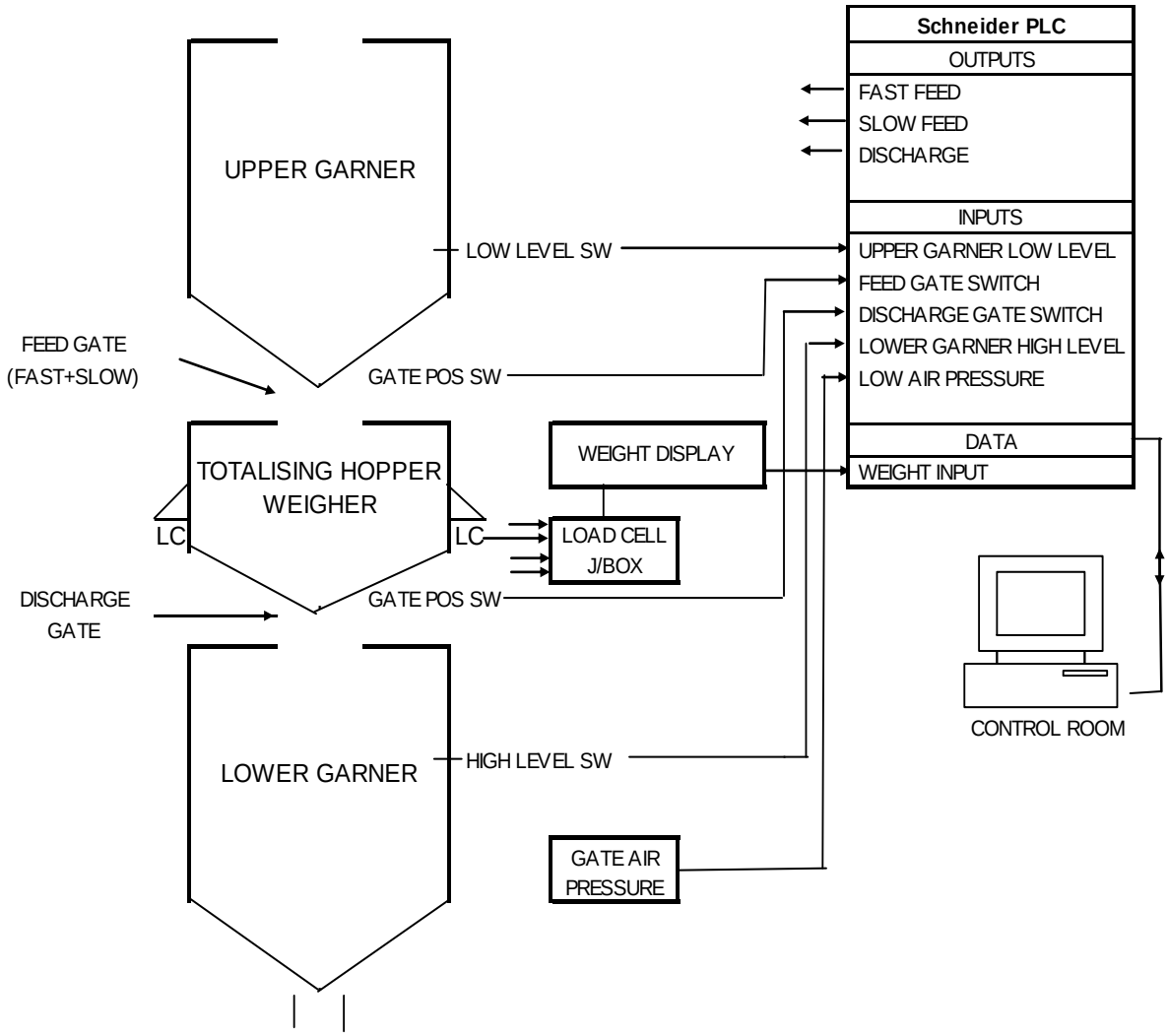
Maximum Permissible Errors

The maximum permissible errors are specified in Schedule 1 of the *National Trade Measurement Regulations 2009*.

FIGURE 6/14B/21 – 1

CBH DTAW1 Totalising Weigh Hopper/Weigh-bin (Kwinana)

FIGURE 6/14B/21 – 2



Co-Operative Bulk Handling Model CBH-DTAW1 Weighing Instrument

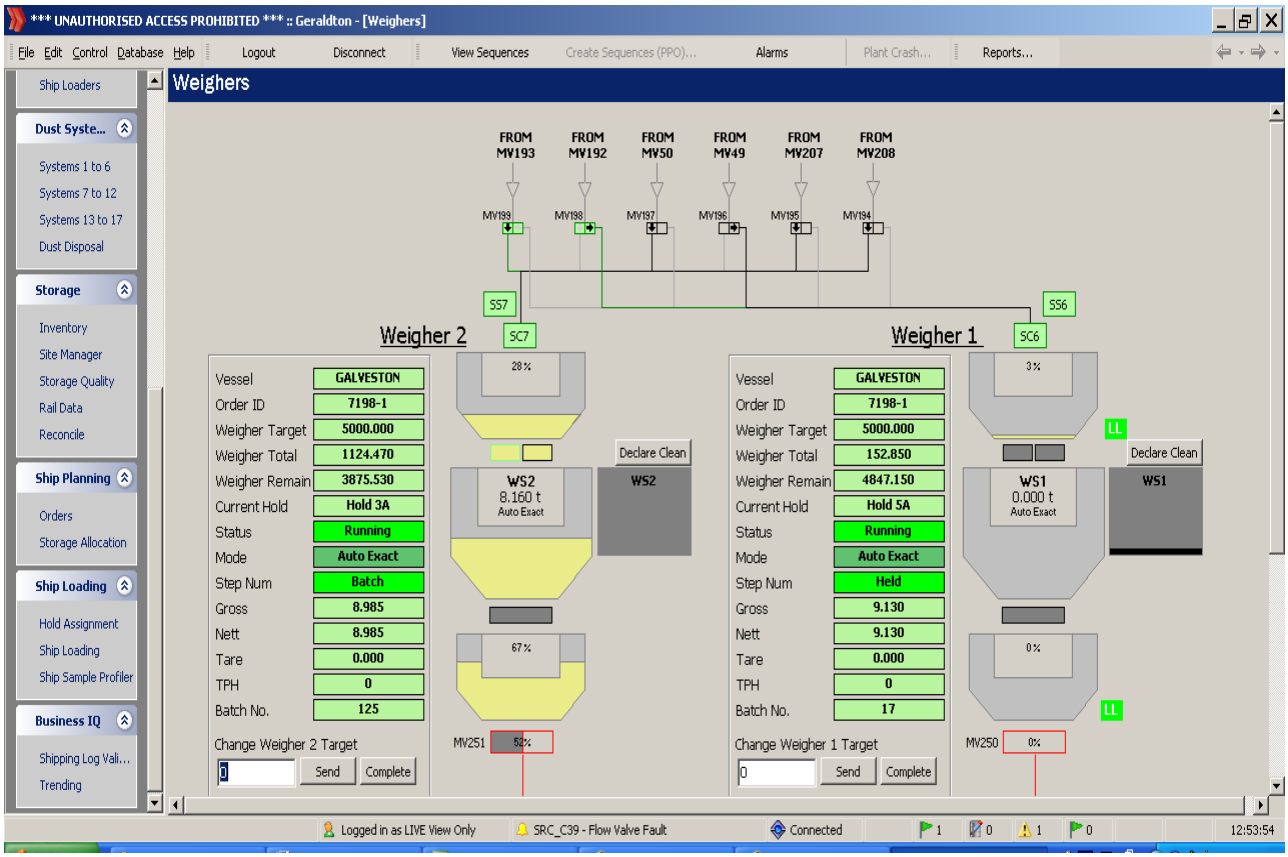
System Overview

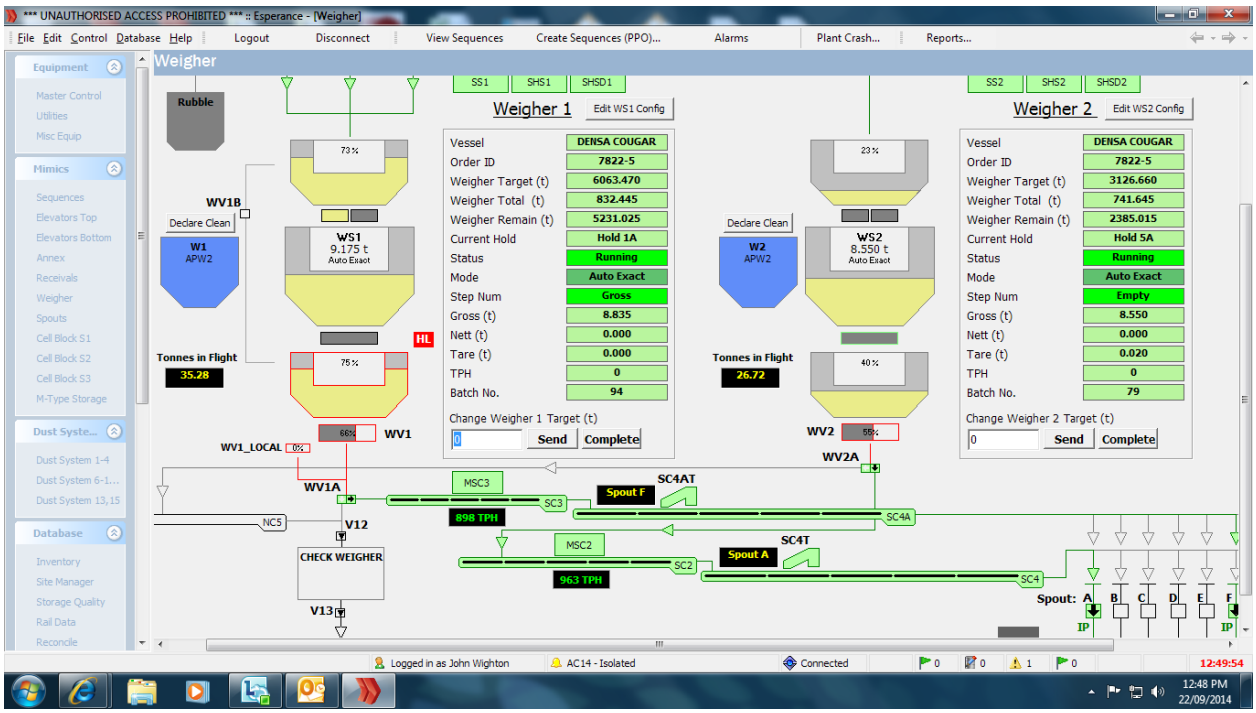
FIGURE 6/14B/21 – 3

Schneider *140 CPU 652 60*

Schneider Modicon PLC

FIGURE 6/14B/21 – 4





Co-Operative Bulk Handling Model CBH-DTAW1 System Operator Screen
(Typical examples - screens may vary between installations)

FIGURE 6/14B/21 – 5

KWINANA

11/09/2014 10:27:44 AM

Batch Weigher Tapes

(NOTE: All weight values are shown in tonnes)

Voyage ID : 1234
Ship Name : SHIP NAME

Target Amount	Commodity	Grade	Actual Amount
20,000	WHEAT	APW2	22000.030

Seq ID	Date	Weigher	Hold	Batch	Nett	Batch Total	Cycle Time	Balance
187806	21/08/2014 11:06:42 AM	W1	Hold 5A	1	11.970	11.970	64	21988.060
187806	21/08/2014 11:07:56 AM	W1	Hold 5A	2	11.965	23.935	74	21976.095
187806	21/08/2014 11:09:04 AM	W1	Hold 5A	3	12.000	35.935	68	21964.095
187806	21/08/2014 11:10:32 AM	W1	Hold 5A	4	11.965	47.900	88	21952.130

…. (part of report deleted – following shows report may spread over many pages, and totalisation sequences)

187806	21/08/2014 12:55:46 PM	W1	Hold 5A	125	11.890	1494.495	48	20505.535
187806	21/08/2014 12:57:44 PM	W1	Hold 5A	126	5.505	1500.000	118	20500.030
187815	21/08/2014 9:19:20 PM	W1	Hold 5A	1	12.015	12.015	63	20488.015

KWINANA

11/09/2014 10:27:44 AM

Batch Weigher Tapes

(NOTE: All weight values are shown in tonnes)

Seq ID	Date	Weigher	Hold	Batch	Nett	Batch Total	Cycle Time	Balance
187815	21/08/2014 9:20:42 PM	W1	Hold 5A	2	11.945	23.960	82	20476.070
187815	21/08/2014 9:21:45 PM	W1	Hold 5A	3	11.940	35.900	63	20464.130
187815	21/08/2014 9:22:41 PM	W1	Hold 5A	4	11.965	47.865	56	20452.165

…. (part of report deleted – following illustrates the report may total results of several weighers)

187831	22/08/2014 11:24:52 AM	W1	Hold 5A	103	11.890	1211.025	53	19145.425
187831	22/08/2014 11:26:48 AM	W1	Hold 5A	104	8.975	1220.000	116	19136.450
				W1 Accum Total:		**2863.580**		
187808	21/08/2014 1:18:58 PM	W1	Hold 3A	1	11.965	11.965	64	19124.485
187808	21/08/2014 1:19:38 PM	W1	Hold 3A	2	11.915	23.880	40	19112.570

…. (part of report deleted – following illustrates the report may total results of several weighers, and Holds)

187833	22/08/2014 10:20:48 AM	W4	Hold 3A	62	11.890	743.620	118	0.000
				W4 Accum Total:		**5207.245**		

Hatch Totals

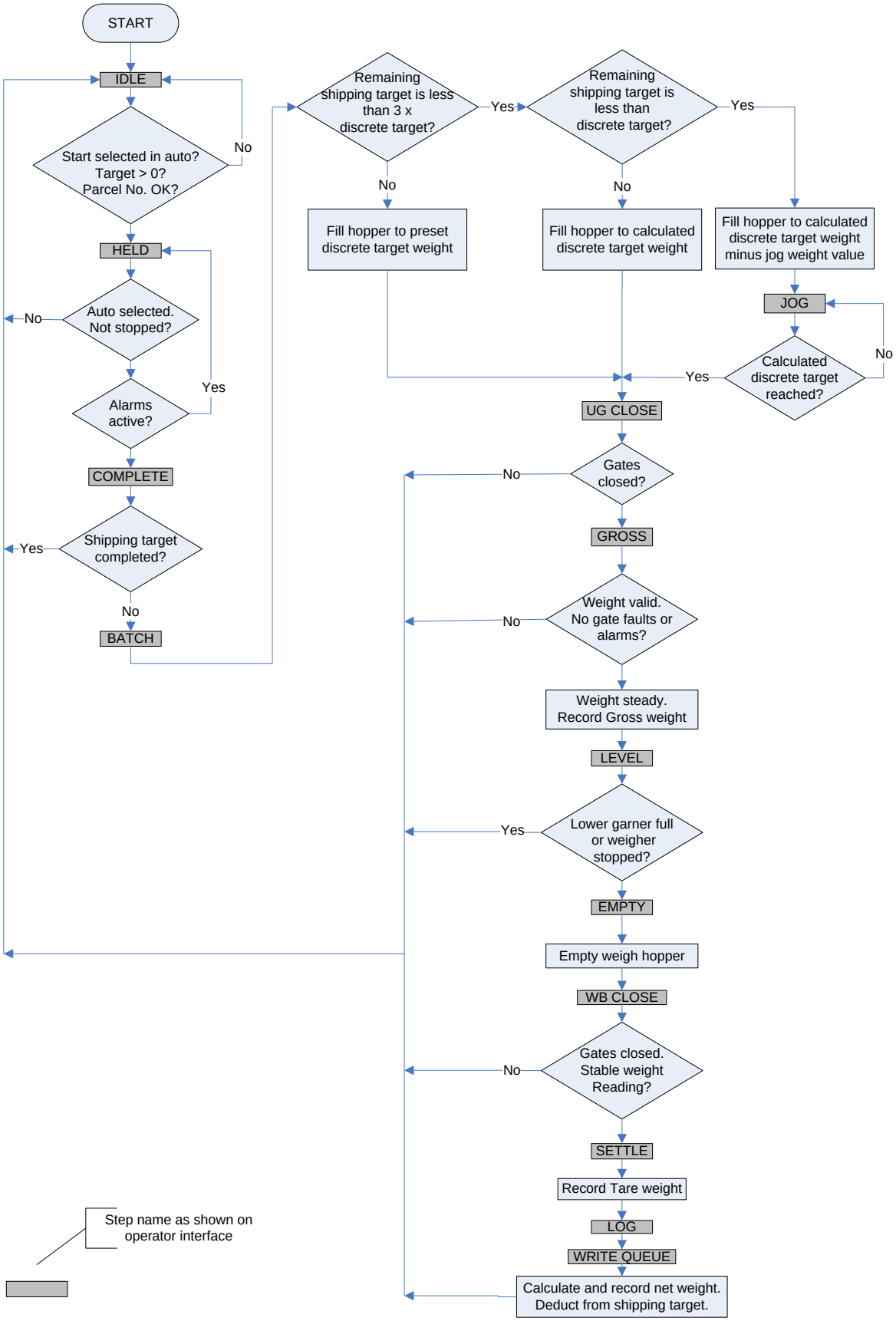
	Target	Actual
Hold 1A	2450	2178.700
Hold 2A	6847.2	7023.480
Hold 3A	6890.4	7080.865
Hold 5A	5812.4	5716.985
	22000	**22000.030**

Weigher Totals

Weigher 1 Total:	5613.830
Weigher 2 Total:	5638.565
Weigher 3 Total:	5540.390
Weigher 4 Total:	5207.245
	22000.030

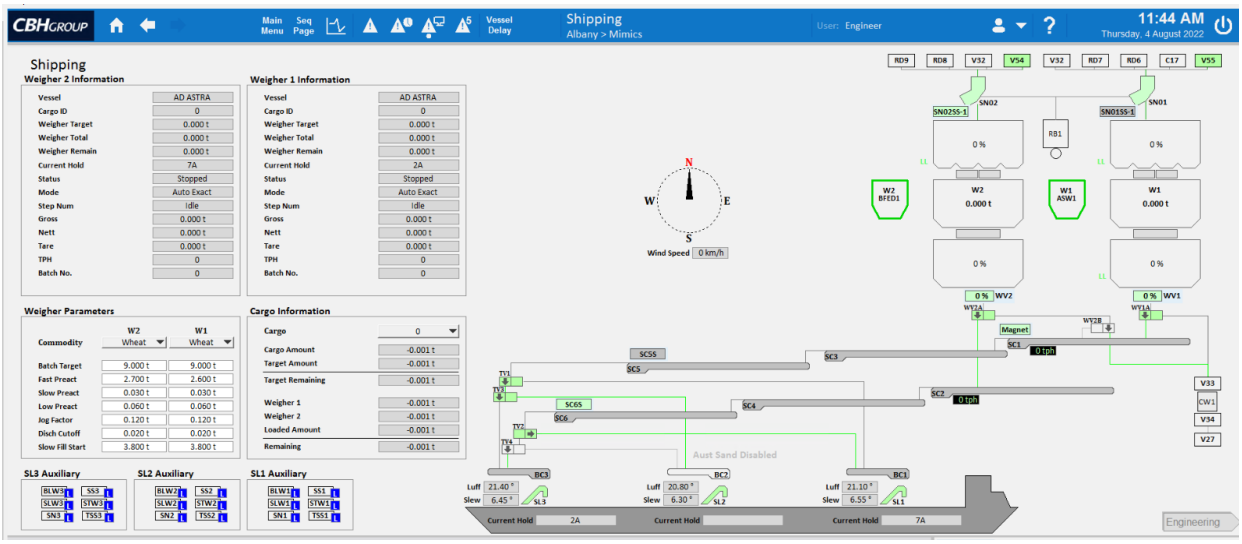
Typical Report Printout

FIGURE 6/14B/21 – 6



Weighing Sequence Flowchart (Overview)

FIGURE 6/14B/21 – 7



Co-Operative Bulk Handling Model CBH-DTAW1 System Operator Screen
(Typical examples - Citect SCADA Software)

FIGURE 6/14B/21 – 8

CBHGROUP Supported by IT

ALBANY

Batch Weigher Report

Voyage ID: **11960**

Ship Name: **PANTAZIS L**

Target Amount	Commodity	Grade
50,000.000	BARLEY	BFED1

(NOTE: All weight values are shown in tonnes)

Seq ID	Date	Weigher	Hold	Batch	Nett	Gross	Tare	Batch Total	Cycle Time (secs)	Balance
115861	19/10/21 9:26:35 AM	W2	2A	1	8.990	8.990	0.000	8.990	65535	54991.010
115861	19/10/21 9:27:19 AM	W2	2A	2	8.990	8.990	0.000	17.980	44	54982.020
115861	19/10/21 9:52:06 AM	W2	2A	3	8.990	8.990	0.000	26.970	1487	54973.030
115861	19/10/21 9:53:35 AM	W2	2A	4	8.990	8.990	0.000	35.960	89	54964.040
115861	19/10/21 9:54:46 AM	W2	2A	5	8.950	8.955	0.005	44.910	71	54955.090
115861	19/10/21 9:55:51 AM	W2	2A	6	8.990	8.990	0.000	53.900	65	54946.100
115861	19/10/21 9:56:55 AM	W2	2A	7	8.985	8.990	0.005	62.885	64	54937.115
115861	19/10/21 9:57:59 AM	W2	2A	8	8.920	8.920	0.000	71.805	64	54928.195
115861	19/10/21 9:58:59 AM	W2	2A	9	8.955	8.960	0.005	80.760	60	54919.240
115861	19/10/21 9:59:52 AM	W2	2A	10	8.965	8.965	0.000	89.725	53	54910.275
115861	19/10/21 10:00:45 AM	W2	2A	11	8.950	8.955	0.005	98.675	53	54901.325
115861	19/10/21 10:01:44 AM	W2	2A	12	9.080	9.080	0.000	107.755	59	54892.245
115861	19/10/21 10:02:38 AM	W2	2A	13	9.040	9.040	0.000	116.795	54	54883.205
115861	19/10/21 10:03:36 AM	W2	2A	14	9.010	9.010	0.000	125.805	58	54874.195
115861	19/10/21 10:04:30 AM	W2	2A	15	9.020	9.020	0.000	134.825	54	54865.175
115861	19/10/21 10:05:25 AM	W2	2A	16	8.970	8.970	0.000	143.795	55	54856.205
115861	19/10/21 10:06:19 AM	W2	2A	17	8.980	8.980	0.000	152.775	54	54847.225
115861	19/10/21 10:07:10 AM	W2	2A	18	8.975	8.975	0.000	161.750	51	54838.250

Weigher Totals

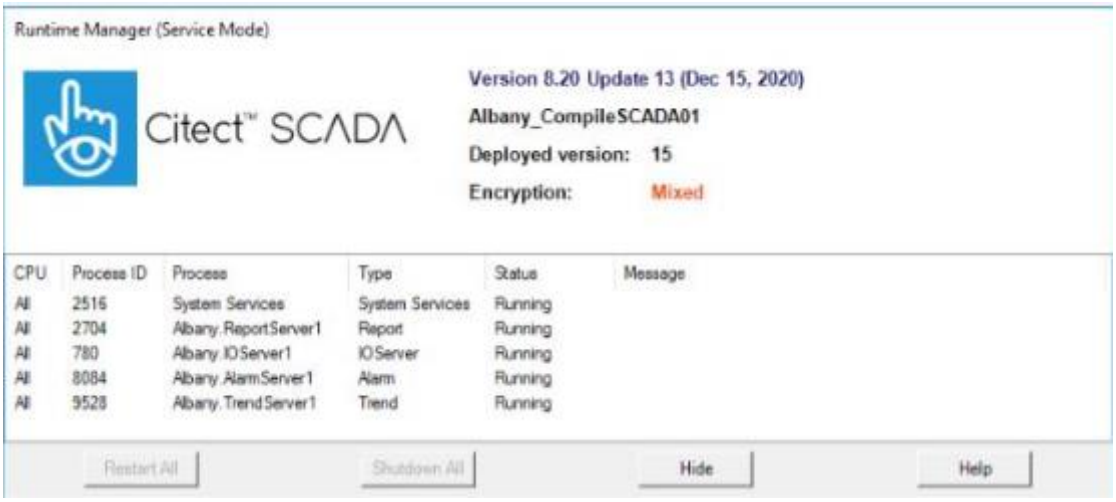
Weigher	Actual
W1	27,733.260
W2	27,266.740
Total	**55,000.000**

Hatch Totals

Hold	Nett
1A	8,647.245
2A	9,604.565
3A	9,838.800
5A	9,689.905
6A	9,618.435
7A	7,601.050
Total	**55,000.000**

Typical Report Printout

FIGURE 6/14B/21 – 9



Citect SCADA Software Version Number

~ End of Document ~