



## **Web-Tech Belt Scale**

### **Selection Guide**

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# BELT SCALE SELECTION GUIDE

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# BELT SCALE SELECTION GUIDE

## *Introduction*

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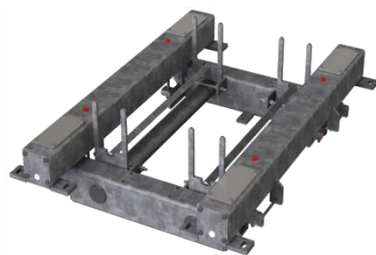
Belt scales are used for a variety of reasons. Most applications require a belt scale to accurately weigh the "total" amount of material that has been conveyed from one location to another. However some applications only require the belt scale to accurately measure the "rate" that the material is being conveyed, and the "total" figure is only of a secondary interest. Other applications place great emphasis on both the "total" and "rate" results.

An example of a "total" application is a shiploading operation, where it is critical to know the actual "total" tonnes that have been loaded into each section of the ship. The ship holds can be relatively easily "topped up" to the required weight, however it is difficult to take excess tonnes back off the ship. A belt scale can be installed on the ship loading conveyor to continually record the "total" tonnes that have been transferred onto the ship, and thereby not have to wait for draft surveys to be carried out.

An example of a "rate" application could be a long drift conveyor transporting coal from underground to the surface. It is important not to overload the conveyor, as this may cause the conveyor to "trip" due to the excessive load. This will then require the material to be shovelled off so that the conveyor can restart. A belt scale can be installed on the drift conveyor to measure the "rate" passing over it, which can then be used to control the rate of feed onto the conveyor avoiding "trip" events.

An example of an application where both the "total" and "rate" are equally important could be a feed conveyor into a coal preparation plant. The "rate" is important as the coal feed into the plant must be maintained at a predetermined setpoint. The "total" input into the plant is important as this determines the yield or quality of the coal when compared to the amount of saleable coal that comes out of the plant. A belt scale can be installed on the feed conveyor to accomplish both functions.

All modern belt scales calculate both "total" and "rate" figures which can be used for whatever purpose. Some also have additional features and options such as in-built controllers, batching facilities and rate alarms which can be used as an adjunct to the primary function. It is important to advise Web-Tech of the belt scales intended purpose when discussing the requirements of a new installation as it will allow us to ensure that all necessary facilities and hardware are available. It is also important to discuss what the technical requirements may be for the interface of the belt scale with other equipment, such as a PLC control, PLC monitoring or a standalone unit.



**WTS1S2 Cal Bars**



**WTS2S2 In Situ**



**WTS4S2 In Situ Billet**

# BELT SCALE SELECTION GUIDE

## *Web-Tech Belt Scale Range*

Model	Description	Typical Applications	Accuracy
<b>E40</b>	Universal type scale, simplest installation, dual load cell.	Aggregate plants, Feeder control	$\pm, 1 - 5 \%$
<b>WTE11</b>	Single idler, single load cell process scale with mechanical tare, belt widths up to 1050 mm.	Aggregate plants, Timber plants, Gold ore plants	$\pm, 1 - 3 \%$
<b>WTE12</b>	Single idler, dual load cell process scale with mechanical tare, suitable for belt widths up to 1600 mm.	Aggregate plants, Timber plants, Gold ore plants	$\pm, 1 - 3 \%$
<b>WTE21</b>	Dual idler, single load cell process scale with mechanical tare, belt widths up to 1050 mm.	Aggregate plants, Timber plants, Gold ore plants	$\pm, 0.5 - 1 \%$
<b>WTE22</b>	Dual idler, dual load cell process scale with mechanical tare, suitable for belt widths up to 1600 mm.	Aggregate plants, Timber plants, Gold ore plants	$\pm, 0.5 - 1 \%$
<b>WTS1</b>	Single idler, dual load cell heavy duty suspended weighframe, suitable for belt widths from 450 to 2400 mm.	All mining applications	$\pm, 1 \%$
<b>WTS2</b>	Dual idler, dual load cell heavy duty suspended weighframe, suitable for belt widths from 450 to 2400 mm.	All mining applications	$\pm, 0.5 \%$
<b>WTS4</b>	Four idler, four load cell, fully suspended weighframe, suitable for belt widths up to 2400 mm.	High accuracy loadouts, Material transfers	$\pm, 0.25 - 0.5 \%$
<b>WTS6</b>	Six idler, four load cell, heavy duty suspended weighframe, suitable for belt widths up to 2400 mm, high belt tension areas.	High accuracy product transfers such as shiploaders	$\pm, 0.1 - 0.25 \%$
<b>WTS8</b>	Eight idler, four load cell, heavy duty suspended weighframe, suitable for belt widths up to 2400 mm, high belt tension areas.	High accuracy product transfers such as shiploaders	$\pm, 0.1 - 0.25 \%$

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# BELT SCALE SELECTION GUIDE

## *Theory of Operation*

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Belt scales enable material to be weighed on a conveyor whilst in motion. A belt scale differs from a static weighing system, such as a bin weighing system, in that the belt scale is required to measure two variables. The first variable is the weight on the conveyor belt, and the second variable is the belt speed or belt travel. The weight of material on the conveyor belt is obtained by measuring the load on one or more idlers. This load can then be expressed in terms of kg/metre of belt. The belt speed or belt travel is measured by using a device which gives an output proportional to the belt speed or belt travel. The flow "rate" of material passing over the belt scale can be expressed as:

Flow Rate = Weight ( Weighframe ) × Speed ( Belt Speed Sensor )

Total Weight = Weight ( Weighframe ) × Belt Travel ( Belt Speed Sensor )

Belt scale manufacturers use either the belt speed (flow rate) or belt travel (total weight) methods depending on their design philosophy. Those that use the belt speed (flow rate) method use a high frequency speed sensor (up to 1 kHz), the output of which is proportional to the belt speed. The integrator primarily calculates the "rate" passing over the belt scale, from which the "total" is then derived. Those that use the belt travel (total weight) method generally use a low frequency speed sensor, which delivers a number of pulses per unit of belt length. The integration primarily calculates the "total" weight, from which the flow "rate" is then derived. Due to the availability of high-speed processors, most modern belt scales use the "rate" method as the basis for their electronic design. Whilst the mathematics used by the belt scale electronics may appear to be relatively simple, the tasks required of the electronics are more complex. Not only must the electronics be capable of receiving and processing the signals from the weighing mechanism and belt speed / travel device, it must also be capable of the following:

- Display Rate and Total readings
- Provide stable power supplies to the weighing and belt speed / travel elements
- Provide analogue and digital outputs for remote equipment
- Provide Automatic Zero and Span calibration facilities
- Provide serial communications for remote computers
- Carry out "Auto Zero" routines when the belt is empty
- Provide alarm functions
- Provide control functions
- Interface with the operator

The measurement of the weight on the conveyor belt and the belt speed / travel also present some physical problems which must be overcome. The accuracy of the weight measurement is dependent on a number of factors such as belt tension, belt construction, weighframe location, troughing angle and material loading. The degree of accuracy and ways of improving the accuracy are discussed in further detail in the following sections.



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# BELT SCALE SELECTION GUIDE

## *Theory of Operation – Weighframe*

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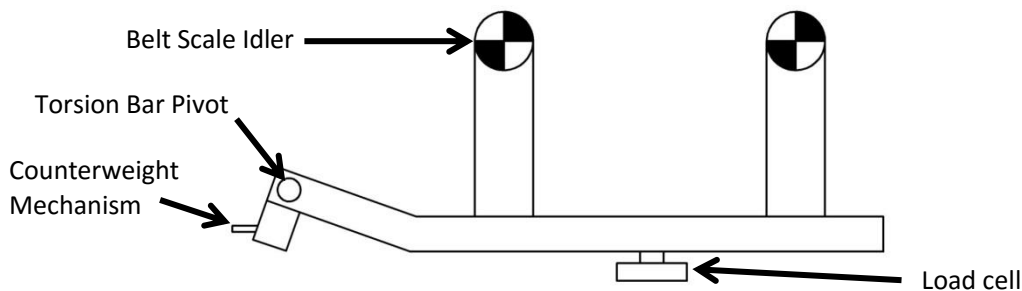
Belt Scales consist of four main components these being:

1. Weighframe and associated weigh idlers
2. Belt speed / travel sensor
3. Electronic Integrator
4. Calibration device

The function of the weighframe is to support the weigh idler(s) and conveyor belt, and to convert the weight of the material within the weigh area to an electrical signal, which can be processed by the electronics. Weighframes are varied in design, however the majority of the designs incorporate one or more transducers, most typically strain gauge load cells. The weighframe is usually self-contained, low profile, and designed to be installed within the limits of the conveyor structure. The number of idlers used is dependent upon the accuracy required, and the conveyor parameters. Various weighframe designs exist, each with their own perceived advantages. Most belt scale manufacturers use either a "pivoted" design or a "fully floating" design. With a pivoted design, one or more idlers are mounted on a frame, which is pivoted at one end by some form of fulcrum point. The fulcrum point is designed to be as frictionless as possible and to require as little maintenance as possible. Early pivot designs included knife edges and bearings or ball bearings, however due to the perceived maintenance problems, and the advent of transducers with very small amounts of movement, these were replaced with components such as torque tubes, flexures or rubber trunnions. The "fully floating" design comprises one or more idlers mounted on frame, which is in turn supported at each corner by a transducer. Horizontal and transverse restrainers limit the movement of the weighframe in any direction, except that perpendicular to the belt line. The advantages of both types of design are as follows:

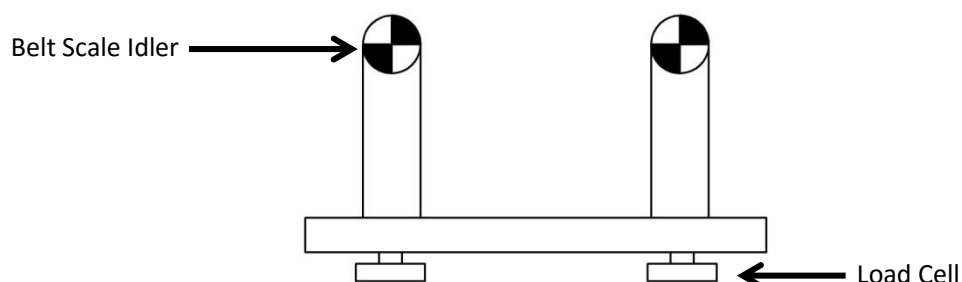
### **Pivoted Type Belt Scales**

- Requires less transducers
- Better sensitivity from the transducers. As the pivoted design can be counterweighted allowing the "deadweight" of the belt and idles to be removed.
- Less calibration weights required



### **Fully Floating Weighframe**

- Same design as used in high accuracy static weighing systems
- Do not use pivots, which could influence measurements
- Forces acting on weigh idlers act directly on transducers
- Calibration weights represent the same weight regardless of where they are placed on weighframe



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# BELT SCALE SELECTION GUIDE

## *Theory of Operation – Speed Sensor*

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As previously discussed, a sensor is supplied to provide a signal to the electronic integrator as to the actual belt speed or belt travel.

### **Belt Speed Sensor**

Belt speed sensors can be supplied in several arrangements. The most common method is for a "rotary" type sensor to be mounted in an enclosure and then to be connected to a "live" shaft pulley, usually the tail pulley. As the pulley rotates, the speed sensor shaft is also rotated, which in turn produces a pulse output. The frequency of the pulse output is proportional to the rotational speed of the pulley. Typical frequencies fall within the range of 100 - 1000 Hz. Belt speed sensors should not be connected to the drive pulley, as any slippage between the drive pulley and conveyor belt will not be measured. A second type of belt speed sensor involves mounting a sprocket at the end of a conveyor roll, and sensing its rotational speed with the use of a "Magnetic Pick-up". The magnetic pick-up counts the number of sprocket teeth that pass by a sensing element, and therefore produces a frequency proportional to the speed. This system is not normally used on applications where the conveyor rolls are subject to material build-up, as this will change the diameter of the roll and therefore the indicated belt speed. However on some applications where the idler rolls appear to be carrying build-up, closer inspection will show that the area of idler roll in contact with the belt remains clean. The advantages of using the idler roll / sprocket type of sensor is that they are relatively simple and robust, and can be situated close to the weighframe. When installed close to the weighframe, the belt speed being measured is the actual belt speed at the weighframe.

A third type of system still popular with some manufacturers / customers is the use of a pivoted "trailing" arm with a wheel in contact with the return belt. The wheel is attached to a rotary sensor similar to that used with the tail pulley method. The disadvantages of this method are:

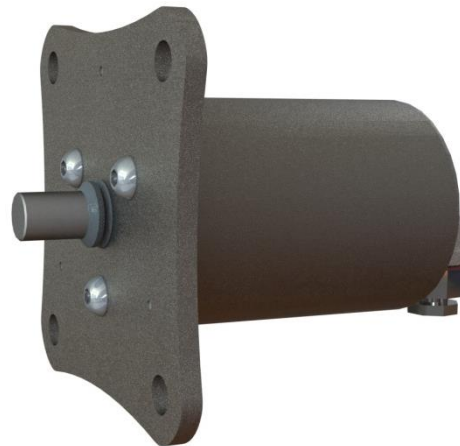
- The wheel is prone to bounce when a disturbance in the belt surface such as a splice passes under it. This will cause a variation in frequency output, and therefore the measured belt speed.
- The wheel is usually mounted on the return belt adjacent to the weighframe. This can be a long distance away from the weighframe (by belt travel), and therefore the belt speed measured may not be the same belt speed at the weighframe.

### **Belt Travel Sensor**

A belt travel sensor usually consists of one or more "flags" welded to a pulley, usually the tail pulley, and a proximity probe. As the flags pass by the proximity probe they are counted, and this relates to the amount of conveyor belt that has passed around the pulley. The advantage of this type of system is that it is relatively simple and robust. However the disadvantage is that it is low frequency in output, and therefore the resolution can be coarse.



**PXT Speed Sensor**



**WXT Speed Sensor**

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# BELT SCALE SELECTION GUIDE

## *Theory of Operation – Integrator*

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The electronic integrator is designed to carry out the following basic functions:

- Provide supply voltages to weighframe transducers and belt speed / travel sensors
- Measure and integrate the instantaneous weight on weighframe and instantaneous belt speed / travel which calculates the mass rate and mass total passing over the conveyor respectively
- Provide analogue and digital outputs for remote equipment
- Provide facilities for calibration

The electronic integrator may also provide the following options:

- Provide P.I.D. control output
- Provide serial communications for remote computers
- Provide rate alarm outputs
- Provide batching facilities

Most modern integrators are microprocessor based with computing power similar to a personal computer. Each manufacturer engineers their own software, which incorporates their own design philosophies. Whilst all integrators may look similar at first glance, the methods used by the various manufacturers to achieve the end-result, can vary significantly. The current "state of the art" integrators are designed to make operation / calibration easier for site personnel, and great emphasis should be placed on the ease of use. Many sites will prefer the belt scale supplier to carry out routine maintenance and calibration, however in an emergency situation, there is nothing worse than having to wade through a manual, attempting to understand what a displayed code means.

### **Integrator Location**

The electronic integrator does not have to be located adjacent to the weighframe. Some customers may wish to mount the integrator in a nearby motor control centre or in a control room. Whilst this is possible the following points should be considered when selecting the location:

- The weighframe transducers produce very low voltage levels and therefore if long cables are used voltage drops may occur
- The longer the cable run, the greater the chance of picking up electrical noise on the cables
- Long distances between weighframe and integrator increases the time required when carrying out calibrations
- Is the proposed area classified as Dust Ignition Proof or Hazardous?

It is Web-Tech's belief that the best location for the integrator is adjacent to the weighframe where possible. The output signals can be used to provide information to remote equipment. The integrator should be mounted so that it is free from vibration, not subject to direct sunlight and rain. If installed outdoors it is suggested that rain / sun hoods are used. When selecting a belt scale system, the following integrator features should be investigated:

- Are the operation /calibration functions displayed / entered in plain English or in code form?
- Is the circuit design truly digital or does it require potentiometer adjustments in its setup?
- Are service and fault finding functions available?
- Does the integrator maintain its accuracy over a wide temperature range, typically 0 to 40oC
- Are the analogue and pulse outputs "isolated"?
- Is the integrator enclosure suitable for the environment?
- Does the system provide automatic zero and calibration facilities?
- Are the integrator outputs compatible with remote equipment?
- Is the integrator supplied with filters on the mains input?
- Can the integrator be easily serviced?



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# BELT SCALE SELECTION GUIDE

## *Theory of Operation – Calibration Device*

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There are basically four methods that can be used to calibrate a belt scale system:

- Material Test
- Calibration Chain / Train
- Static Calibration Weights
- Electronic Simulation

### **Material Test**

A material test is the best form of test that can be done. The test involves collecting an amount of material that has passed over the belt scale, and weighing it on an accurate static weighing system such as a weighbridge or bin weighing system. Other methods of testing simulate material loading, however only a material test duplicates the actual operating conditions of the conveyor. With regard to the amount of material required for a test, a general rule of thumb is a test of 10 minutes duration. When considering the installation of a belt scale system, a method of diverting material from the process should be investigated. It is essential when carrying out a material test that it can be guaranteed that all of the material that has passed over the belt scale has been collected.

### **Calibration Chain / Train Test**

A calibration chain / train is a device that sits on the conveyor belt above the weighframe approach and retreat idlers. It is restrained in position whilst the conveyor is run, and simulates material loading. A calibration chain consists of a series of interconnected steel rolls, which is manufactured to represent approximately 80 % of the maximum belt loading. A calibration train is similar to a chain, except that it consists of a series of interconnected carriages, which can be loaded with weights to simulate various belt loadings. The disadvantages of calibration chains / trains are as follows:

- They are generally expensive, sometimes more expensive than the belt scale they are testing
- They require additional personnel to set up
- They have to be stored above the conveyor and therefore a storage structure has to be built
- They require maintenance

### **Static Weight Test**

Static weight tests are the most common form of testing carried out on Belt Scales. All belt scale manufacturers offer calibration weights as an option with the system, the weight and quantity sized to approximate 75 - 80 % of maximum belt loading. The calibration weights are applied directly to the weighframe, the belt is run, and material loading is simulated. This is the method Web-Tech generally uses to calibrate our belt scales. The advantages of this method are as follows:

- Can be applied by one person, and for high belt loadings, permanent weights that can be jacked on / off the weighframe can be installed
- If a material test can be initially carried out, they can be referenced to the material test results
- Repeatability tests are easy to carry out
- This is generally the cheapest method

The disadvantages of static calibration weights are as follows:

- They cannot exactly duplicate the running conditions of the conveyor
- They sit directly on the weighframe, and therefore do not duplicate the belt effects
- They tend to be lost

### **Electronic Simulation Test**

Electronic Simulation tests are carried out without the use of weights, material or chains. When the test is initiated, a "shunt" resistor is applied across the transducer input, which creates an offset. The value of the resistor is usually calculated to represent approximately 75 - 80 % of maximum belt loading. A test value is initially established at the time of commissioning, which can then be used to check the repeatability of the system. This method of testing does not obviously take into account the belt effects or conveyor running conditions. Web-Tech provides this method of testing as a standard feature, however we do not place great emphasis on its use.

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# BELT SCALE SELECTION GUIDE

## *Theory of Operation – Conveyor Design*

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Conveyors are designed to transport material from one location to another, and not specifically for the benefit of a belt scale. A belt scale is often an afterthought, and therefore the conveyor design may be less than ideal for accurate and repeatable results. The following is a summary of recommended conveyor design.

### **Weighframe Location**

The weighframe should be located in a position where the belt tension and belt tension variations are minimal. Generally speaking this location is at the tail end of the conveyor at the loading point. However sufficient distance from the loading point should be provided to allow the material to be settled, and be travelling at the same velocity as the belt. Typically for most products, this is approximately 6 idler widths or from 6-9 metres.

### **Conveyor Inclination**

Ideally the conveyor would be horizontal to provide for more consistent belt tensions, however this is not generally practical. The conveyor inclination angle should not be so great as to allow the product to roll back. This will cause a positive error (some material will be weighed twice) from the belt scale.

### **Concave and Convex Curves**

Concave curves should be avoided where possible. The weighframe should be located as far away as possible from the tangent point of the curve, and no closer than 20 metres. Convex curves are less of a problem, however the weighframe should be located no closer than 6 metres from the tangent point of the curve.

### **Conveyor Take-up**

The conveyor should preferably be fitted with gravity take-up on the return belt. Gravity take-ups located on the tail pulley are acceptable, however less desirable. Screw take-ups on short conveyors (less than 15 metres) may be acceptable, however not preferred.

### **Belt Loading**

Belt loading should be uniform and consistent. Belts should be sized so that they are volumetrically 75 - 80 % full.

### **Belt Type**

The selected belt type should use the minimum number of plies possible. Additional plies add to the stiffness of the belt and therefore reduce the achievable accuracy. Steel cored belts are the least desirable due to the stiffness of these belts. Conveyor belts should be uniform in weight, with a minimum of splices. Metal clip fasteners should not be used.

### **Belt Tracking**

Belt tracking should be central to the idlers regardless of belt loading. Training idlers should not be used any closer than 5 idler spacings from the weighframe.

### **Conveyor Idlers**

It is more desirable to use idlers with shallow troughing angles. Idlers with 20° angle are better than 30° angle, and 30° is better than 35°. Idlers with 45° troughing angle can be used, however errors due to belt tension changes are more significant. The steepness of the troughing angle determines the planar moment of inertia of the belt, which determines how susceptible the Belt Scale is to belt tension variations and misalignment. Idlers on the weighframe, two approach and two retreat idlers should be:

- In-Line "Weigh Quality"
- Rolls should be machined concentric to provide 0.13 mm Total Indicated Runout
- Rolls to be balanced within 0.011 Nm
- Rolls to be fitted with some form of height adjustment

On some low accuracy applications, some of the above requirements may not be required.

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# BELT SCALE SELECTION GUIDE

## *Theory of Operation – Conveyor Design*

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### **Idler Alignment**

The mechanical alignment of the weigh approach and retreat idlers is critical. The height misalignment in this area should be no greater than  $\pm 0.4$  mm. Mechanical misalignment of these idlers will cause the accuracy of the system to vary depending on belt tension variations. It is advisable to have the belt scale supplier assist in the mechanical installation.

### **Conveyor Stringers**

The conveyor stringers should be rigid, free from vibration and capable of supporting the load without deflection. The weighframe's and approach / retreat idlers should not be installed where joins in the stringers exist if this is not possible, stringers should be welded together using "fish" plates. The stringers should be suitably supported in the area of the weighframe / approach / retreat idlers so that the total deflection within the weigh area does not exceed 0.25 mm.

### **Environmental Protection**

Where the conveyor is exposed to the elements, errors may be induced by external influences such as wind. Errors equivalent to 30 tonnes per hour have been measured on large conveyors subject to high wind velocities. These errors can be minimised by installing guards, which protect the weighframe and 5 metres of conveyor in each direction. Where possible, supply the belt scale manufacturer with a detailed arrangement drawing of the proposed installation with as many parameters as known.



**WTS1S2 Belt Scale in Operation**

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# BELT SCALE SELECTION GUIDE

## *Theory of Operation – Belt Scale Accuracy*

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Most belt scale manufacturers can supply a number of different model weighframes and electronic integrators. Some models may appear to duplicate each other in regard to accuracy specifications and general features. For example, two different model weighframes may be specified at an accuracy of  $\pm 0.5\%$ . However one model may be designed for medium duties with relatively light belt loadings and the other for heavy-duty applications with high belt loadings. When you examine the construction of the weighframe, will it stand up to the duty?

The accuracy of the system will be determined by the weighframe type, as the same model electronics will normally be used regardless of the accuracy requirements. More than one model electronics may be available, however this is generally because they offer various options. When specifying a desired accuracy for the belt scale system, the application should be investigated thoroughly. Like most equipment, the higher the accuracy specified the more expensive the system will be.

Belt scale accuracy depends on a number of factors such as belt tension, belt type, location and belt loadings. However they are usually categorised into one of three groups.

**SINGLE IDLER**     Used for general purpose process scales, with typical accuracies in the order of 1% to 3%.

**DUAL IDLER**     Used for inventory purpose scales with typical accuracies of 0.5%.

**MULTI IDLER**     Used for high precision systems such as ship loaders and scales for payment purposes. Accuracies typically 0.25% or lower.

However in some applications it may be necessary to use a four idler weighframe to achieve 1% accuracy. On other applications, a single idler weighframe may achieve 0.5% accuracies. The belt scale supplier will require certain information regarding the application, which should be detailed on their "Application Data" sheets. It may be preferable to allow the supplier to review the data and advise what options are available in regard to the possible accuracy versus the costs, rather than specifying the accuracy.



**WTS4S2 in Operation**  
**4 Idler Precision Belt Scale**

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# BELT SCALE SELECTION GUIDE

## *Theory of Operation – Maintenance*

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Many belt scale installations are ignored until a problem exists. Like all equipment a minimum of maintenance will assist in providing long-term reliability. For multiple installations at the one site it may be worth contracting the Belt Scale supplier to carry out the maintenance and regular calibrations. These visits can also be used to provide basic training for the site personnel in the event of an emergency breakdown situation. These site visits are normally scheduled at three monthly intervals.

The following work should be carried out on a regular basis:

Clean down of build-up on weighframe and removal of spillage

Inspection and cleaning of idler rolls

Zero calibrations

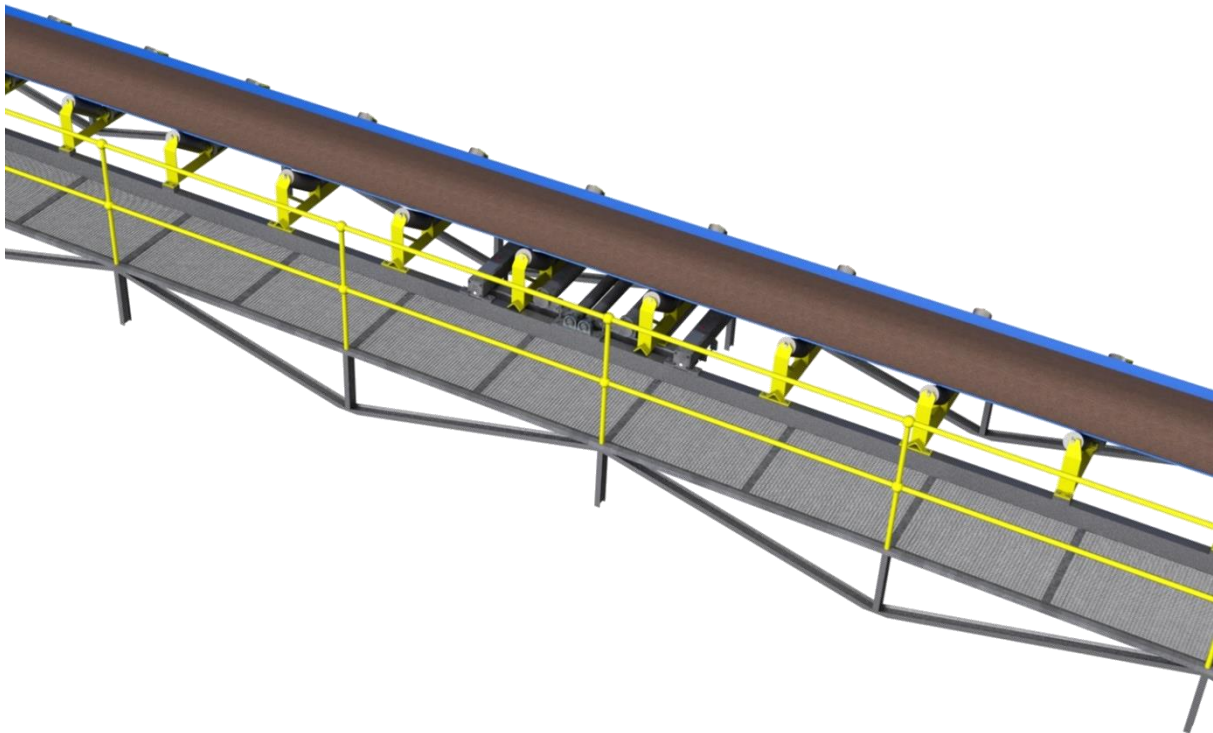
Inspect belt tracking

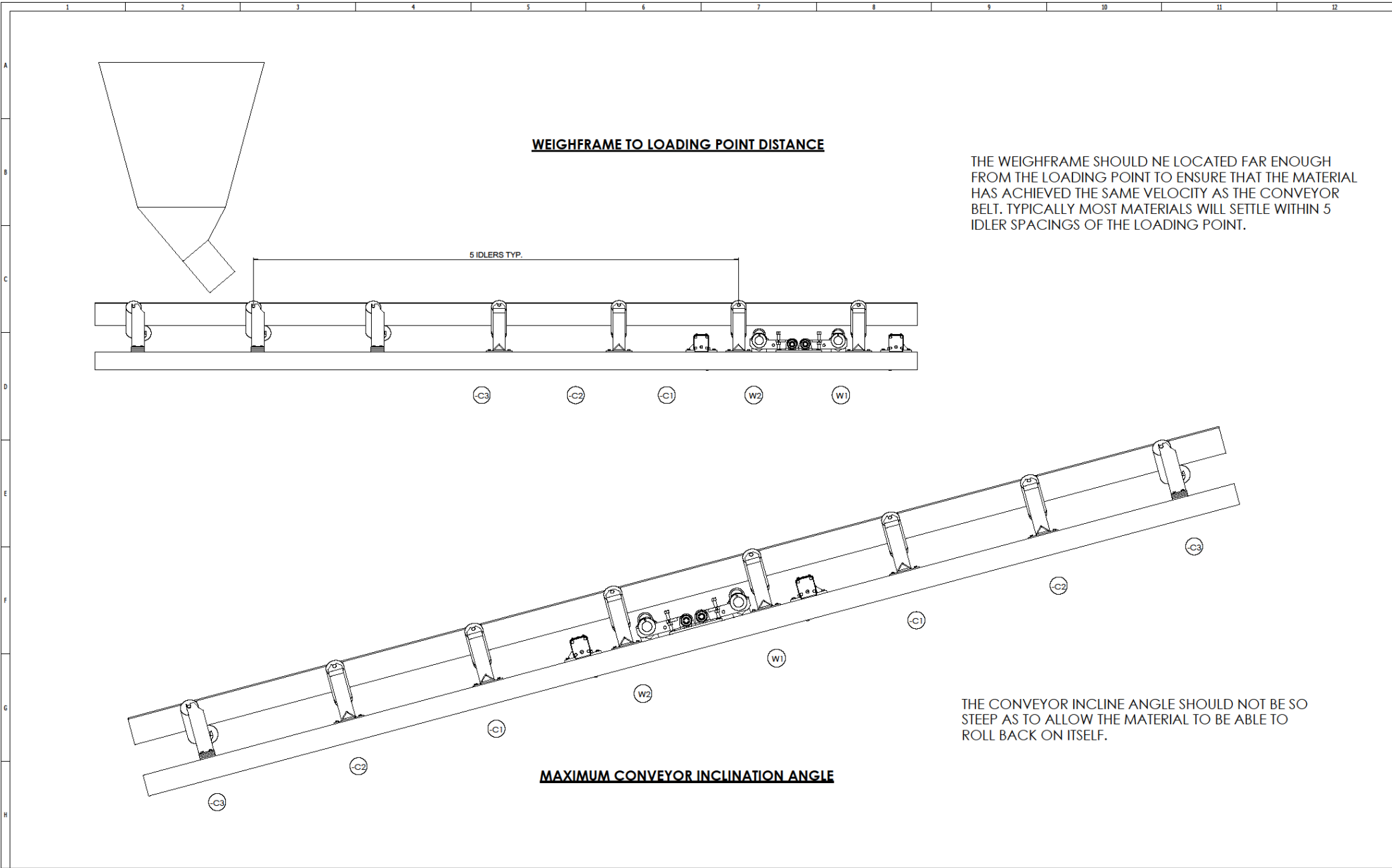
Inspect belt wear


The following work can be carried out less frequently:

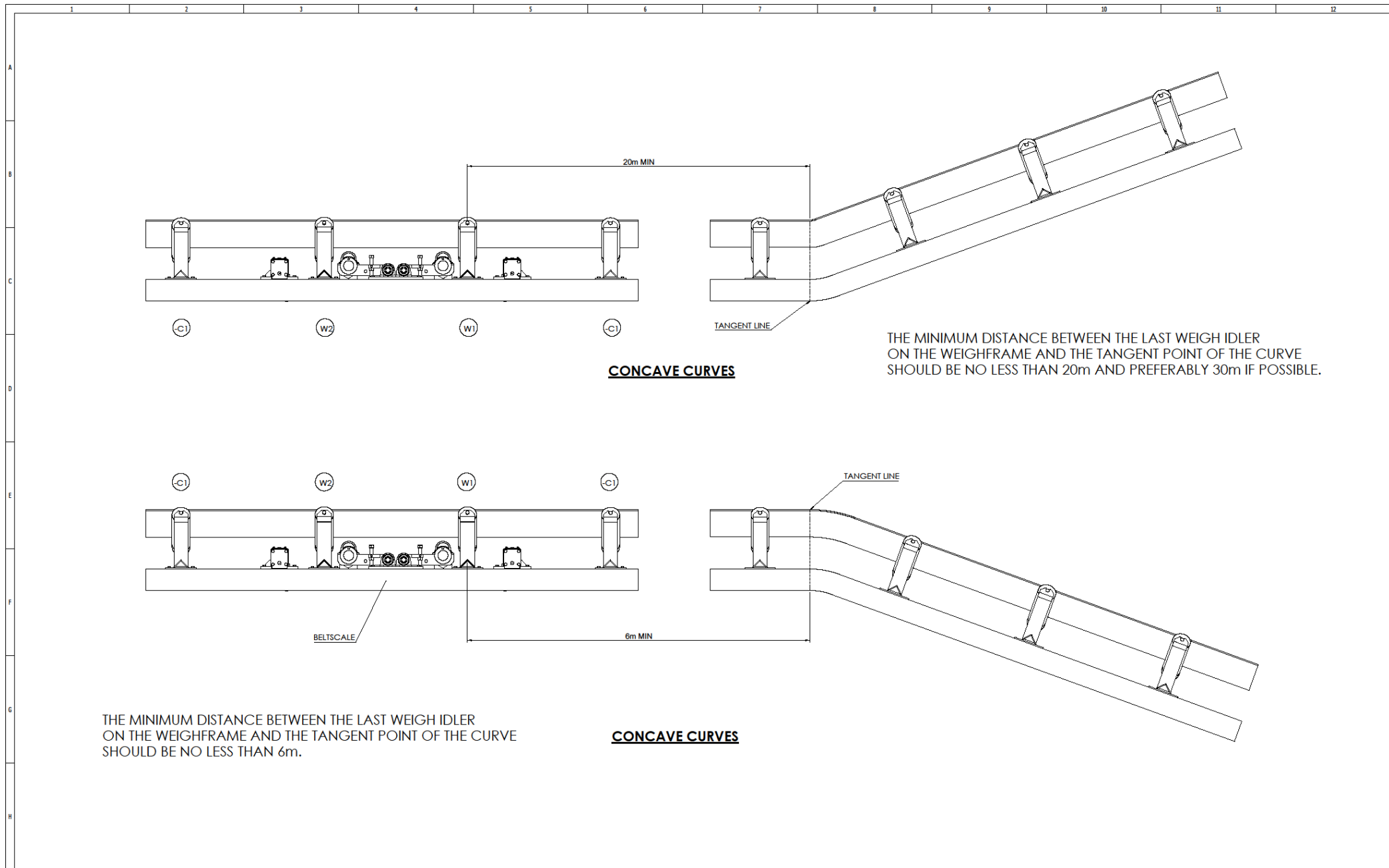
- Span calibrations
- Check mechanical alignment
- Balance transducers (where necessary)
- Check cabling and junction boxes



Apart from the general housekeeping of the installation, the other important aspect that should be addressed is the record keeping for each installation. Most modern belt scale electronics store all data in battery backed or non-volatile memory, however in the case of catastrophic failure this data will probably be lost or not accessible. At these times it is essential that accurate records be available for reprogramming purposes. Accurate records also allow review of the belt scale performance and possible problems that may require attention.

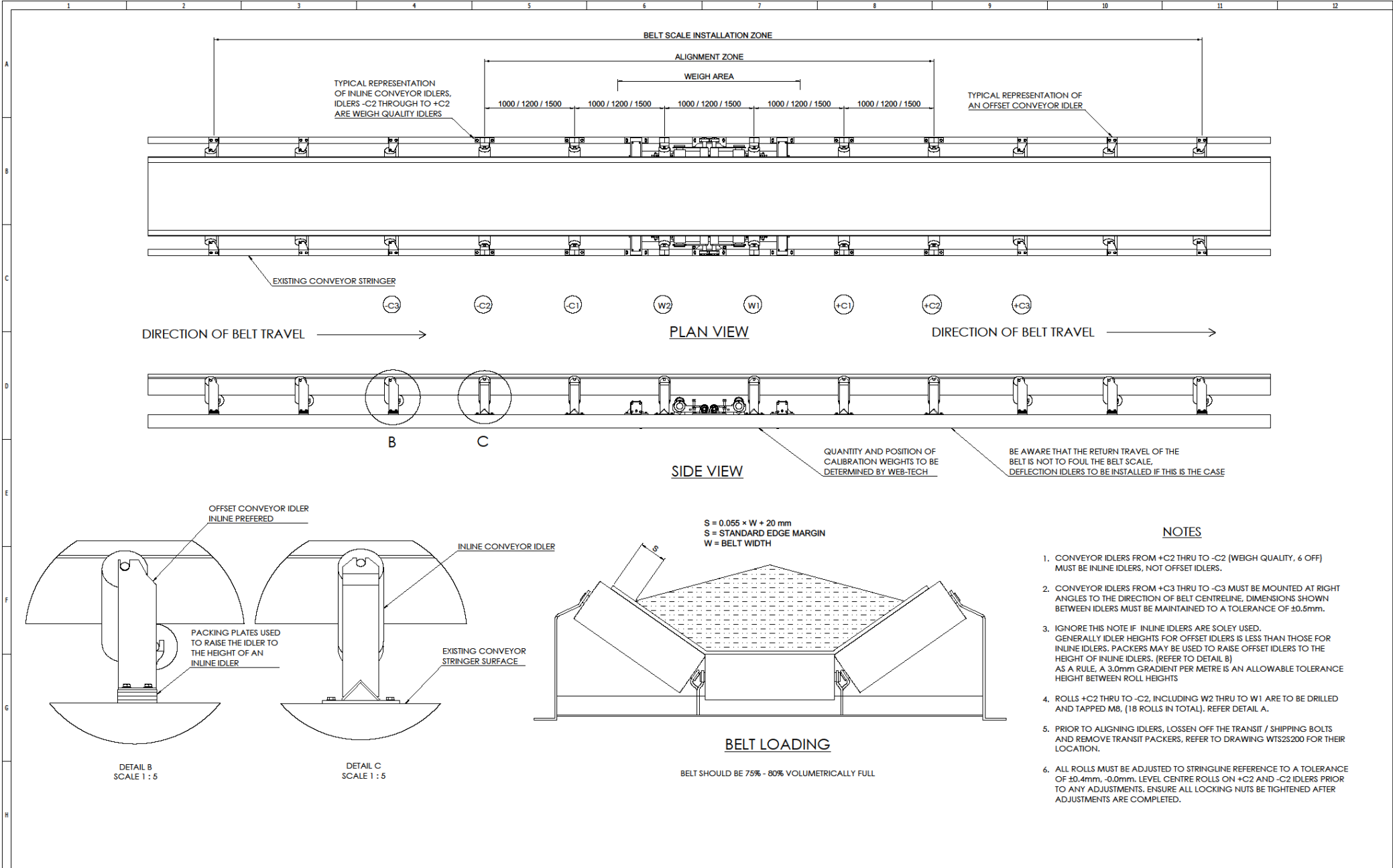





REVISIONS A1: 30/06/16 B. ROBINSON ISSUED FOR APPROVAL	UNLESS OTHERWISE STATED UNTOLERANCED DIMENSIONS TO BE WITHIN THE LIMITS SHOWN					DRAWN B. ROBINSON	 <div>WEB-TECH AUSTRALIA PTY. LTD. ACN 620 786 481 11 ELECTRONICS STREET (OFF FREE PLANKS, QUEENSLAND, 4111 AUSTRALIA P.O. BOX 4088 STAFF HILL PLANKS, QUEENSLAND, 4111 AUSTRALIA Phone +61 7 3941 2844 Fax +61 7 3941 2855</div>	SIZE A1	DRAWING No. NUMBER BSSG01	REV. A	
	NOMINAL SIZE	UP TO 50	50 TO 150	150 TO 300	300 TO 600	CHECKED		TITLE CONVEYOR LOADING DISTANCE MAXIMUM CONVEYOR INCLINATION	PROJECT CUSTOMER	CNO FILE BSSG01 - Loading Distance - Max Inclination	
	MACHINING	+ 0.1	+ 0.2	+ 0.3	+ 0.5	+ 1.0					DATE APPD
	FABRICATION	+ 0.5	+ 0.5	+ 0.5	+ 1.0	+ 2.0					SCALE
	ASSEMBLY	+ 0.5	+ 0.5	+ 0.5	+ 1.0	+ 2.0					DO NOT SCALE IF IN DOUBT ASK
ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SPECIFIED							The drawing and any information or description contained on or hereon are the confidential and proprietary property of WEB-TECH AUSTRALIA PTY. LTD. and shall remain confidential, unused or used for manufacturing or training in any other person without their written permission.				

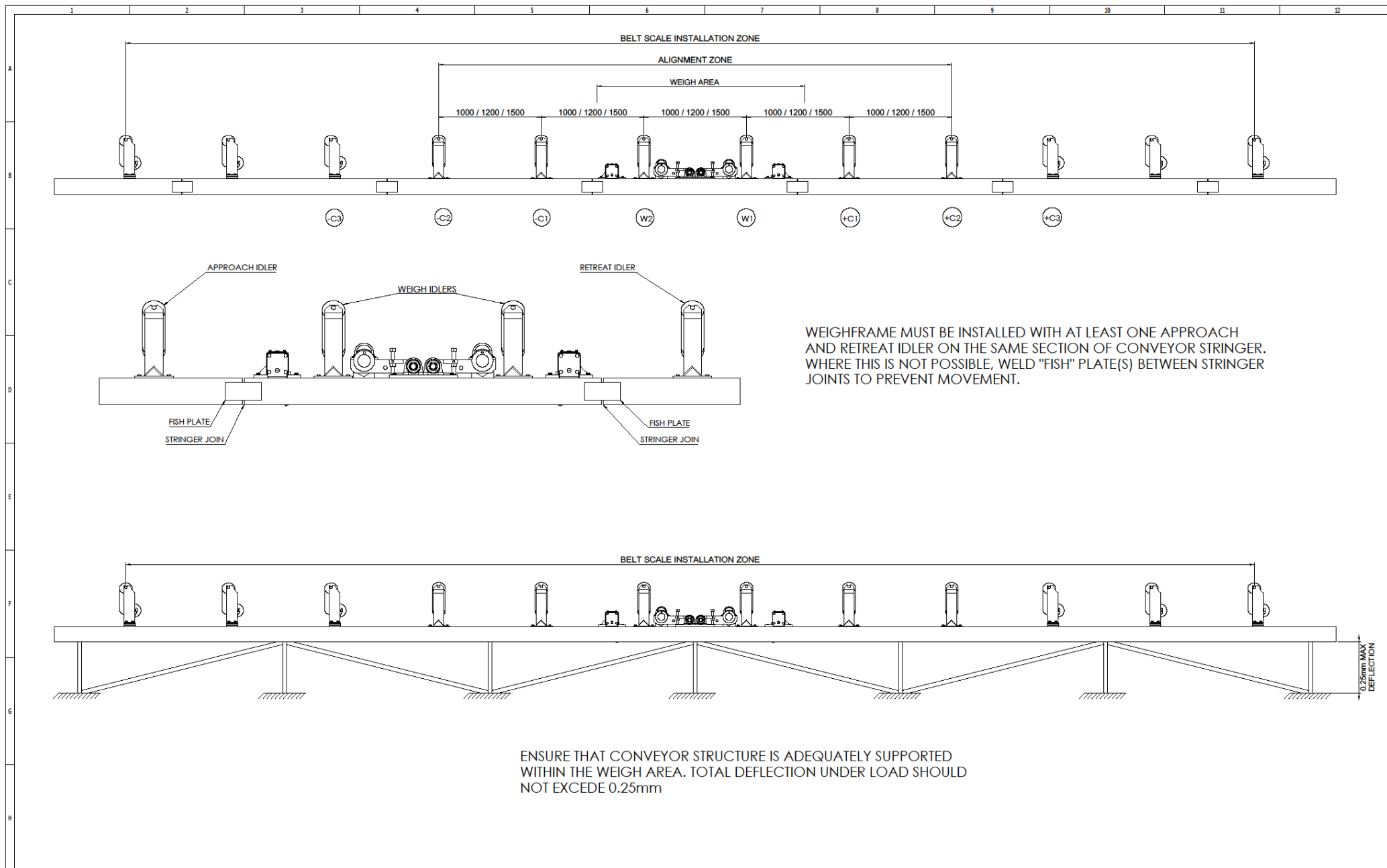




REVISIONS A: 30/06/16 B.ROBINSON ISSUED FOR APPROVAL	UNLESS OTHERWISE STATED TOLERANCES DIMENSIONS TO BE WITHIN THE LIMITS SHOWN					DRAWN	B.ROBINSON	 WEB-TECH AUSTRALIA PTY. LTD. ACAL 010 764 411 10 ELECTRONICS STREET (EIGHT HILL PLAINS, QUEENSLAND, 4111, AUSTRALIA P.O. BOX 404 (EIGHT HILL PLAINS, QUEENSLAND, 4111, AUSTRALIA Phone: +61 7 3861 2841 Fax: +61 7 3861 2852	SIZE	DRAWING No.	
						CHECKED			A1	NUMBER	REV.
						APPROVED				BSSG02	A
						DATE APPD				CUSTOMER	
						SCALE	N.T.S.			PROJECT	
										CADD FILE	
						DO NOT SCALE IF IN DOUBT ASK				BSSG02 - Concrete Curved Concrete Curves	



REVISIONS	A: 20/06/16 B.ROBINSON ISSUED FOR APPROVAL	UNLESS OTHERWISE STATED UNITS/UNLESS OTHERWISE STATED DIMENSIONS TO BE WITHIN THE LIMITS SHOWN	DRAWN	B.ROBINSON		WEB-TECH AUSTRALIA PTY. LTD. ALFA 100 704 413 15 EUCUMBER STREET, EIGHT HILLS PLANE, QUEENSLAND, 4111 AUSTRALIA P.O. BOX 4004, EIGHT HILLS PLANE, QUEENSLAND, 4111 AUSTRALIA Phone +61 7 3841 2844 Fax +61 7 3841 2855	SIZE	DRAWING No.		REV.	
	B: 23/08/16 B.ROBINSON ISSUED FOR APPROVAL							A1	NUMBER		BSSQ03
	C: 23/08/16 B.ROBINSON ISSUED FOR APPROVAL								CUSTOMER		
	D: 23/08/16 B.ROBINSON ISSUED FOR APPROVAL								PROJECT		
	E: 23/08/16 B.ROBINSON ISSUED FOR APPROVAL								CAD FILE		
	F: 23/08/16 B.ROBINSON ISSUED FOR APPROVAL								BSSQ03 - Weighspan and Belt Loading		
	G: 23/08/16 B.ROBINSON ISSUED FOR APPROVAL								©		
	H: 23/08/16 B.ROBINSON ISSUED FOR APPROVAL										
	I: 23/08/16 B.ROBINSON ISSUED FOR APPROVAL										
	J: 23/08/16 B.ROBINSON ISSUED FOR APPROVAL										
TITLE		CHECKED		APPROVED		A1	BSSQ03	B			
DATE APD		SCALE		N.T.S.							
DO NOT SCALE IF IN DOUBT ASK		UNLESS OTHERWISE SPECIFIED		ALL DIMENSIONS IN MILLIMETRES							
UNLESS OTHERWISE SPECIFIED		UNLESS OTHERWISE SPECIFIED		UNLESS OTHERWISE SPECIFIED							
MINOR SIZE		UP TO 50		TOLERANCE		PROJECT					
UP TO 50		TOLERANCE		UP TO 50		C20 FILE					
TOLERANCE		UP TO 50		UP TO 50		BSSQ03 - Weighspan and Belt Loading					
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<b>REVISIONS</b> A: 30/06/16 B.ROBINSON ISSUED FOR APPROVAL B: 22/07/16 B.ROBINSON REMOVED APPROVED WEIGHT IDLER NUMBERED WTS2S LABEL C: 23/08/16 B.ROBINSON FIXED WEIGH ZONE, WEIGH AREA AND ALIGNMENT ZONE	UNLESS OTHERWISE STATED UNITS/STANDARD CONFORMING TO BE WITHIN THE LIMITS SHOWN					DRAWN B.ROBINSON	 <b>WEB-TECH AUSTRALIA PTY. LTD.</b> A.C.N. 610 394 401 11 ELECTRONICS STREET (SUITE 101) MELBOURNE, QUEENSLAND, 4111, AUSTRALIA P.O. BOX 408 (SUITE 101) MELBOURNE, QUEENSLAND, 4111, AUSTRALIA Phone +61-3-9862 2888 Fax +61-3-9862 8885	SIZE A1	DRAWING No. NUMBER BSSG04	REV. C
	MINORAL SIZE UP TO 50 ABOVE 50 UP TO 100 ABOVE 100 UP TO 200 ABOVE 200					CHECKED APPROVED DATE APPTD		TITLE CONVEYOR STIFFENING		
	WIDENING + 0.1 + 0.2 + 0.3 + 0.5 + 1.0 FABRICATION + 0.5 + 0.5 + 0.5 + 1.0 + 2.0 ASSEMBLY + 0.5 + 0.5 + 0.5 + 1.0 + 2.0					SCALE N.T.S. DO NOT SCALE IF IN DOUBT ASK		CUST FILE BSSG04 - Conveyor Stiffening		
	ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SPECIFIED							©		

