Takeoff

Area Operations Guide Prepared for:

Israel

Gyptech

Proven Technology Worldwide

Revision Date: 9 May 2025

Introduction

This manual contains **Original Instructions** written to assist in the normal operation of the takeoff area. This provides an overview only. For more detailed information regarding maintenance, please refer to the maintenance manual specific to the equipment being maintained. Personnel should undergo proper training before attempting to operate any piece of equipment.

TABLE OF CONTENTS

Textmarkenichtdefi

T e x t m a r k

1 Safety Overview

This **Area Operations Guide** provides a brief overview only. For the safe operation and maintenance of specific equipment, read the **Gypsum Technologies Operation & Maintenance Manuals**. For **Safety** information see the **Gyptech Boardplant General/Safety Overview Manual**.

Never put yourself at risk.

Many pieces of equipment have the potential to cause serious injury or even death. Be sure to understand the safety concerns related to a piece of equipment before undertaking or performing any maintenance or clean out procedure. Work with your supervisors to address any safety concerns prior to undertaking work.

CAUTION: This document should be read in conjunction with the Gypsum Technologies Equipment Manuals. This document provides an overview only. Important safety information is contained in the equipment manuals. This section is NOT a complete safety procedure for performing maintenance or cleaning functions.

All personnel must operate in compliance with both company policies and local regulations.

All personnel must follow **Lockout/Tagout (LOTO)** procedures (see Section **1.1 Lockout / Tagout Procedures**).

CAUTION: Equipment has the potential to cause severe injury or even death.

Important: Before undertaking or performing any maintenance or clean out procedure, be sure to understand the safety concerns related to a piece of equipment. NEVER put yourself at risk.

Note: For any safety concerns, speak with your management prior to undertaking any work.

1.1 Lockout Procedures

Before performing maintenance or cleaning procedures, always ensure the isolation of any potential sources of motive power (e.g., electrical, hydraulic, steam, compressed air, etc.) by implementing a lockout. Be aware that some equipment may store potential energy, such as those held in elevated positions by hydraulic or pneumatic pressure and may unexpectedly move or fall if pressure is released. Additionally, hazards could arise from the movement of equipment or materials located upstream or downstream of the locked-out machine.

The electrical lockout can be conducted either at the electrical panel or locally via a zone disconnect, depending on the equipment configuration. For pneumatic systems, remove pressure by locking out the manual air disconnect switch. To further ensure safety, confirm that the equipment in the system is not

operational after lockout. This can be verified by testing with the standard startup methods, such as the operator controls at the HMI station or the manual HOA switch, if available.

The above procedure is recommended where no other lockout procedure is defined. Operating and maintenance staff must follow lockout procedures and operate in compliance with their company policy and local regulations.

CAUTION: Equipment may move or suddenly fall.

Important: Before performing equipment maintenance or cleaning functions, ALWAYS Lock Out motive power sources (electrical, hydraulic, compressed air, pneumatic, etc.).

1.1.1 LOTO Procedure

Prior to performing any equipment maintenance or cleaning, this **LOTO** procedure must be followed:

1. Identify the equipment that needs to be locked out
2. Shut down equipment
3. Confirm **Area/Zone** is turned **OFF**
4. Open the **Disconnect** switch
5. Place a personal **Lock** on the switch to prevent system from being re-energized
6. Confirm that no personnel are in the **Area/Zone**
7. Test the **Lockout** by putting equipment or motor into **Manual** mode for a few seconds to confirm that it will not start, then back to the **OFF** position

To continue operation, remove **Lock** from the switch, and then turn switch back to the **ON** position

1.2 Drive Panel Electrical Disconnect Switches

Drive panel electrical disconnects serve as a means of physically isolating a specific area. Each drive panel is equipped with a lockable, panel-mounted disconnect switch that isolates all motor circuits within that panel. Prior to performing maintenance or cleaning, ensure that the zones are turned OFF before opening the disconnect switch. Once the disconnect switch is opened, a lock must be applied to prevent the system from being re-energized. For additional safety, after opening the disconnect switch, the equipment or motor should be switched to manual mode for a few seconds to confirm that the motor will not start, and then returned to the OFF position.

1.3 Zone Electrical Disconnect Switches

The area is organized into sub-sections, referred to as "zones." The zone system is utilized for managing the starting and stopping of groups of equipment as well as for lockout procedures. Each zone is equipped with a dedicated electrical disconnect switch.

Zone electrical disconnect switches are used to electrically isolate a specific zone. To achieve this, the zone must be turned OFF prior to opening the disconnect switch. After the switch is opened, a lock must be applied to prevent the system from being re-energized. For safety, the equipment or motor should be placed

in manual mode for a few seconds following the opening of the disconnect switch to verify that the motor will not start, and then returned to the OFF position.

CAUTION: Equipment may automatically start.

Important: To prevent equipment from being re-energized after an Electrical Disconnect Switch has been opened, ALWAYS place a lock on the switch.

1.4 Air Dump and Disconnect Valves

Equipment that requires compressed air is equipped with an electronically controlled air dump solenoid in conjunction with a manual valve for lockout procedures. In some cases, air pressure is automatically released from the equipment, while in others, manual air release is necessary by operating the manual Air Disconnect.

CAUTION: Equipment automatically dumps air pressure under some circumstances.

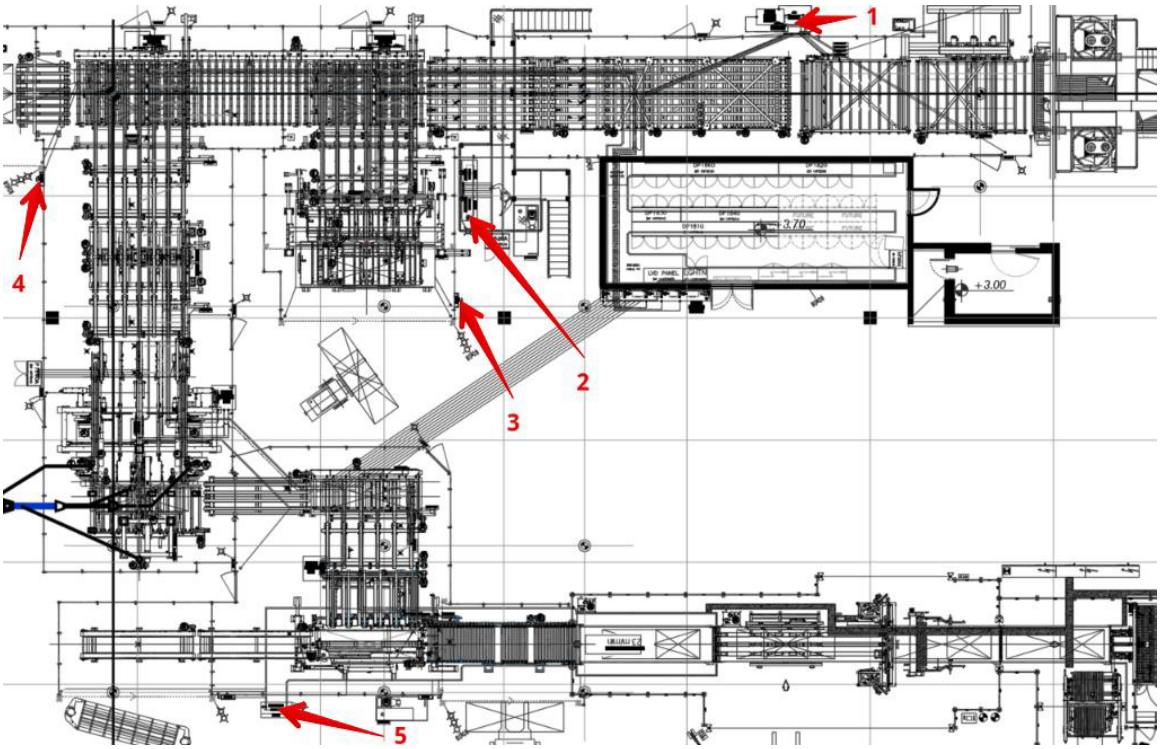
Important: Once air is dumped, ALWAYS ensure that air pressure has been isolated and locked out before servicing any piece of equipment.

1.5 Emergency Stop Pushbuttons

Emergency stop buttons are strategically located throughout the area. Activating any of these emergency stop pushbuttons will immediately halt the entire area or stop equipment. To restore power to the equipment, the emergency stop button must be released, and the safety system must be reset from the operator console. The equipment will be re-energized almost immediately after the reset. All emergency stop button locations for the Take-Off Area are depicted in the image below**.**

CAUTION: Use E-Stops only in an EMERGENCY Only – NOT for normal shutdown.

Important: Using E-Stop Push Buttons for normal shutdown can cause equipment damage.



1.6 Light Curtains

Light curtains may monitor areas requiring frequent operator access during normal operation. These devices project an infrared barrier that stops a zone when personnel pass through the barrier. Once the barrier is restored the operator must return to an HMI console or switch to reset the zone and return it to normal operating conditions. Light curtains must not be used as a safety lockout for maintenance or cleaning purposes.

1.7 Gate Switches and Controlled Access

A physical barrier such as a safety fence often surrounds potentially hazardous areas that generally don't require access during normal operation. These areas are accessible only through designated safety gates. To open the gate the operator must request access and wait until the area has been safely shutdown and isolated before the gate will open. Once the operator has exited the area and closed the gate the system can be reset, and normal operation can be restored. No personnel should ever try to override this gate system or enter the gated area while equipment is operational.

1.7.1 Gate Access System

The **Gate Access System** is designed for incorporation into your **Lockout/Tagout (LOTO) Program**.

For **Gate Access**, from the **Gate Control Panel**, press the Yellow **REQUEST ACCESS** PB. The following sequence takes place:

1. PLC performs a controlled stop of the Zone
2. VFDs are put into STO
3. Automatic Safety Air Dump activates

4. Safety PLC verifies that all gate access prerequisites have been satisfied (STO and Air Pressure switch) and designated time delay expired
5. Gate Solenoid energizes to permit access to the zone
6. Safety Beacon slowly Blinks BLUE
7. Once the Safety Beacon becomes **Solid BLUE**, the Gate can be opened

Note: The Gate can be Locked in the **OPEN** position.

When the Gate is closed and the Safety Beacon slowly blinks **BLUE**, the Gate must be Locked by pressing the **BLUE Reset** PB on the control panel to reactive the Gate Solenoid. Once the Safety Beacon stops blinking and turns **OFF**, the Zone can be restarted by pressing the **White Zone Start/Stop** PB.

1.7.2 Gate Control Panel

Each **Gate** has a **Push Button** control panel with lights that indicate if it is safe to unlock the gate.

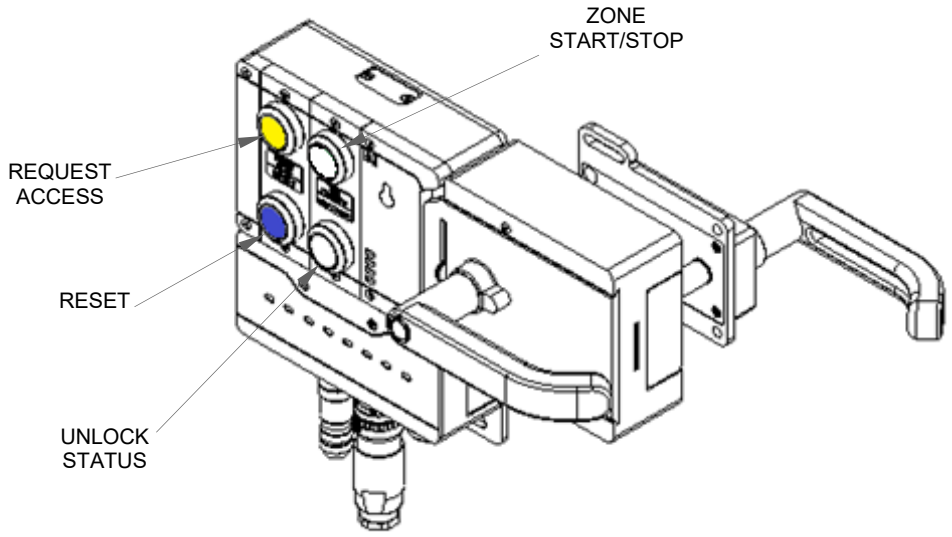


Figure 2: Gate Control Panel

Table 1: Gate Control Panel Push Buttons

Color	Push Button	When Pressed
YELLOW	**REQUEST ACCESS**	Releases Gate Handle when conditions are met, allowing access to a Zone
WHITE	**ZONE START/STOP**	Starts and Stops a Zone; button is Solid White when a Zone is running
BLUE	**RESET**	Returns gate to Locked state

WHITE	**UNLOCK STATUS**	Gate Solenoid status

Table 2 Safety Beacon Gate Status

Beacon	Gate Status
OFF	Gate is **CLOSED**; Locked
SLOW BLINKING BLUE	Gate is **CLOSED**, **Unlocked** **Note**: RESET is required
SOLID BLUE	Gate is **OPEN**, **Unlocked**
FAST BLINKING BLUE	A **Safety Fault** condition exists **Note**: RESET on **HMI Safety** screen, a technician may be required

1.8 HMI Safety Overview Screen

The status of the safety system and all safety devices can be viewed on the HMI by referring to the Area Safety Overview screen. While the HMI system provides valuable information and diagnostic tools, none of its functions are to be considered a replacement for physically isolating equipment and being alert and aware of potentially hazardous situations.

1.9 Safe Torque Off

Safe Torque Off (STO) is an integrated safety function of the **Variable Frequency Drive (VFD)** which ensures that no torque generating energy can be applied to a Motor and prevents unintentional starting in accordance with machinery safety standard EN 60204-1.

CAUTION: The STO function does NOT electrically disconnect VFDs.

Important: The STO only halts torque after a set delay to enable the motor to deaccelerate and stop in safe manner rather than coasting to stop – power is usually still connected to the VFD.

When the **STO** stops pulses at the insulated-gate bipolar transistor (IGBT), it secures a drive, qualifies against the EN 60204-1 code, and then the motor or machining actuator does not restart until STO has

reset. For a Variable Frequency Drive (VFD**)** without the **Safe Torque Off** function, time is needed to properly discharge before power is restored.

The **STO** function along with **Safety Gates** allow safer equipment functionality when accessing equipment for housekeeping and clearing jams.

1.10 HOA Functionality

HAND-OFF-AUTO (HOA) switch controls for each **Motor** are on HMI.

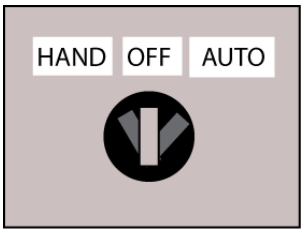


Figure 1.1 HOA Selector Switch Layout

Table 1.1 HOA Operations

Switch Position	Operation
HAND	• Manually powers the Motor • Causes Motor to run, overrides any interlocks • Equipment runs continuously • Used only for maintenance purposes
OFF	• Stops the Motor
AUTO	• Normal operating position for the Motor, Automatic • Allows control from the PLC • Equipment responds appropriately to Line Start and Stop requests

1.11 PLC Controls

Safety relays and all safety devices are monitored by the **Programmable Logic Controller (PLC)**. When a problem occurs, the **HMI** identifies which hard-wired device has been activated, and then displays status to aid in rapid troubleshooting.

1.12 Shutdown Guidelines

General Safety Guidelines to follow during **Shutdown**, and before any maintenance or repair work is started on motor-driven equipment:

- Confirm that the relevant control switch is in **OFF** position, and remains in the **OFF** position
- Confirm that power supply to equipment is shut off and locked at:
    - The main control switch
    - The local safety switch to the respective motors
- Display a "**WORK IN PROGRESS**" sign on the equipment
- NEVER make a by-pass connection of a **Safety** switch (not even if it's faulty) – Replace it!
- For any fault that could lead to personal injury, report this to the nearest person in responsibility
- Keep locking keys to relay cabinets, etc. in a safe place accessible only to authorized personnel

1.13 General Safety

Refer to General Safety manual.

2 Area Overview

The takeoff area typically receives long board from the Dryer, books them face-to-face, trims them to an accurate length using the end trim saw, cuts them into saleable lengths using the finishing saw, stacks the saleable boards into units using the finger stackers, and stacking them via the Stacker/Eveners system. Boards can be rejected at corner reject, reject feedback. Boards are typically rejected due to quality issues or downstream problems.

Board rejected due to downstream problems can be re-fed back into the system to prevent wasted board. This can occur at the Dry Transfer 1 with reject feedback system.

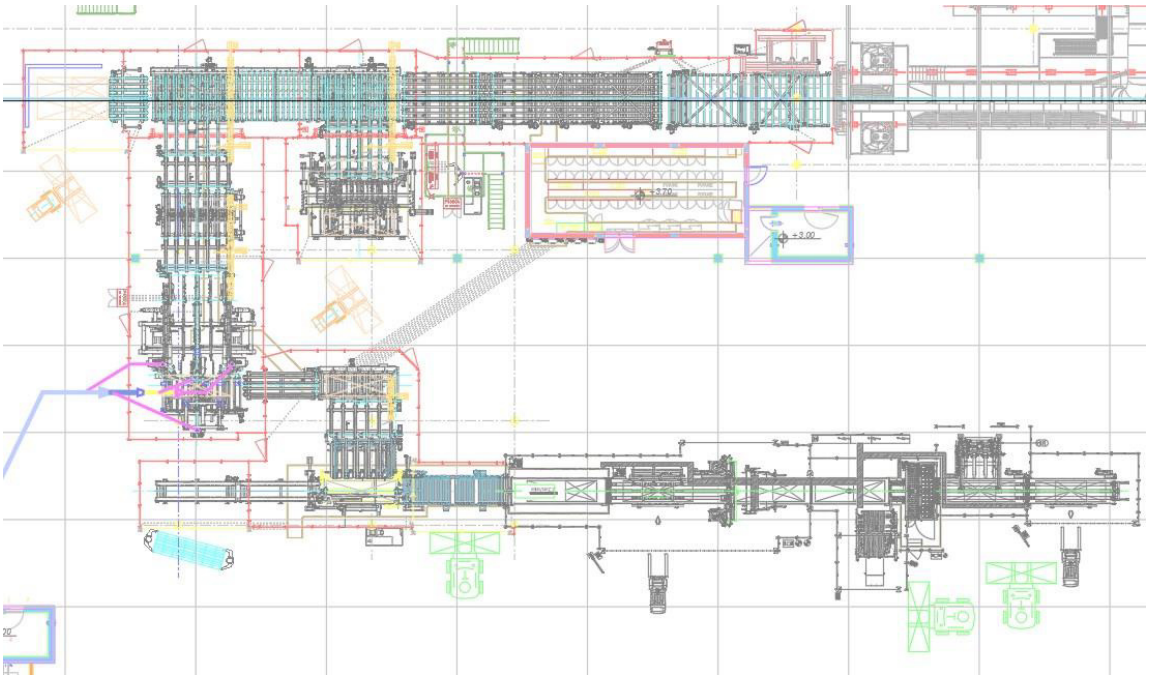


Figure 1: Takeoff General Arrangement

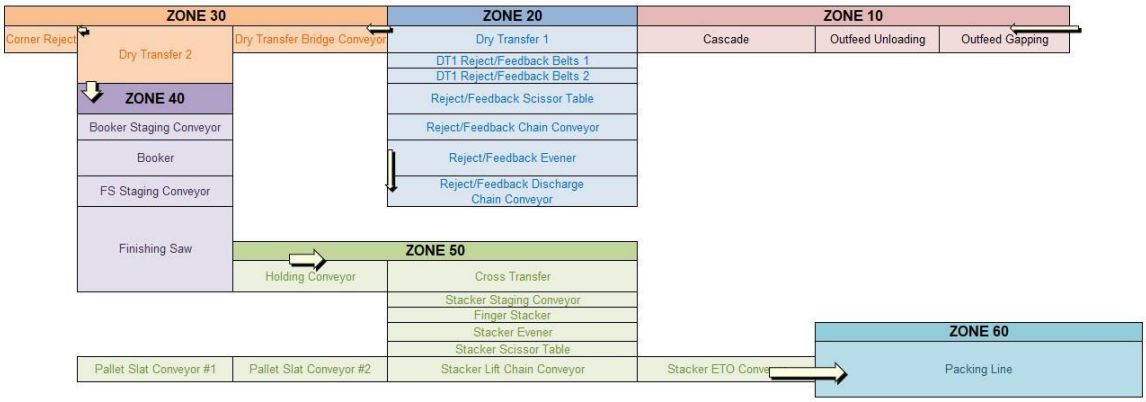


Figure 2: Takeoff Zones & Areas

The Takeoff is divided into Zones to accommodate isolating groups of equipment allowing proper locking out of energy sources for maintenance purposes. This eliminates the need to use a multitude of locks for isolation and allows for easier, more understandable, isolation of Energy sources.

The Takeoff area zones contain the following equipment:

- **Zone 10**
  - Outfeed Gapping
  - Outfeed Unloading
  - Cascade
- **Zone 20**
  - Dry Transfer 1
  - Dry Transfer 1 Reject Feedback Belts 1
  - Dry Transfer 1 Reject Feedback Belts 2
  - Reject Feedback Chain Conveyor/Scissor Table
  - Reject Feedback Suction Cups
  - Reject Feedback Evener
  - Reject Feedback Discharge Chain Conveyor
- **Zone 30**
  - Dry Transfer Bridge Conveyor
  - Dry Transfer 2
  - Corner Reject

- **Zone 40**
    - Booker Staging Conveyor
    - Booker
    - Finishing Saw Staging Conveyor
    - Finishing Saw

- **Zone 50**
    - Holding Conveyor
    - Cross Transfer
    - Stacker Staging Conveyor
    - Finger Stacker
    - Stacker Evener
    - Stacker Scissor Table
    - Stacker Lift Chain Conveyor
    - Pallet Slat Conveyor 1
    - Pallet Slat Conveyor 2
    - Stacker ETO Conveyor

- **Zone 60**
    - Packing Line

2.1 Zone 10 – Outfeed to Cascade

The Outfeed zone delivers board as a single continuous flow from the multiple decks of the Dryer to the Dry Transfer 1. This zone consists of individual conveyors on each deck with two distinct functions, gapping and unloading. Board must be unloaded evenly with proper timing at the correct setting to ensure an even flow and an equal gap between each set to prevent boards from colliding at the Dry Transfer 1.

2.1.1 Outfeed Gapping Conveyor

The Outfeed Gapping Conveyor accelerates boards exiting the Dryer, creating gaps between them. A gapping switch is positioned near the start of each deck on the conveyor. These switches detect the presence of boards on the decks, and the resulting signals are used by the PLC to adjust the speed, acceleration, and deceleration rates of the conveyors leading up to the gates. The Outfeed Gapping Conveyor then feeds into the Outfeed Unloading Conveyor.

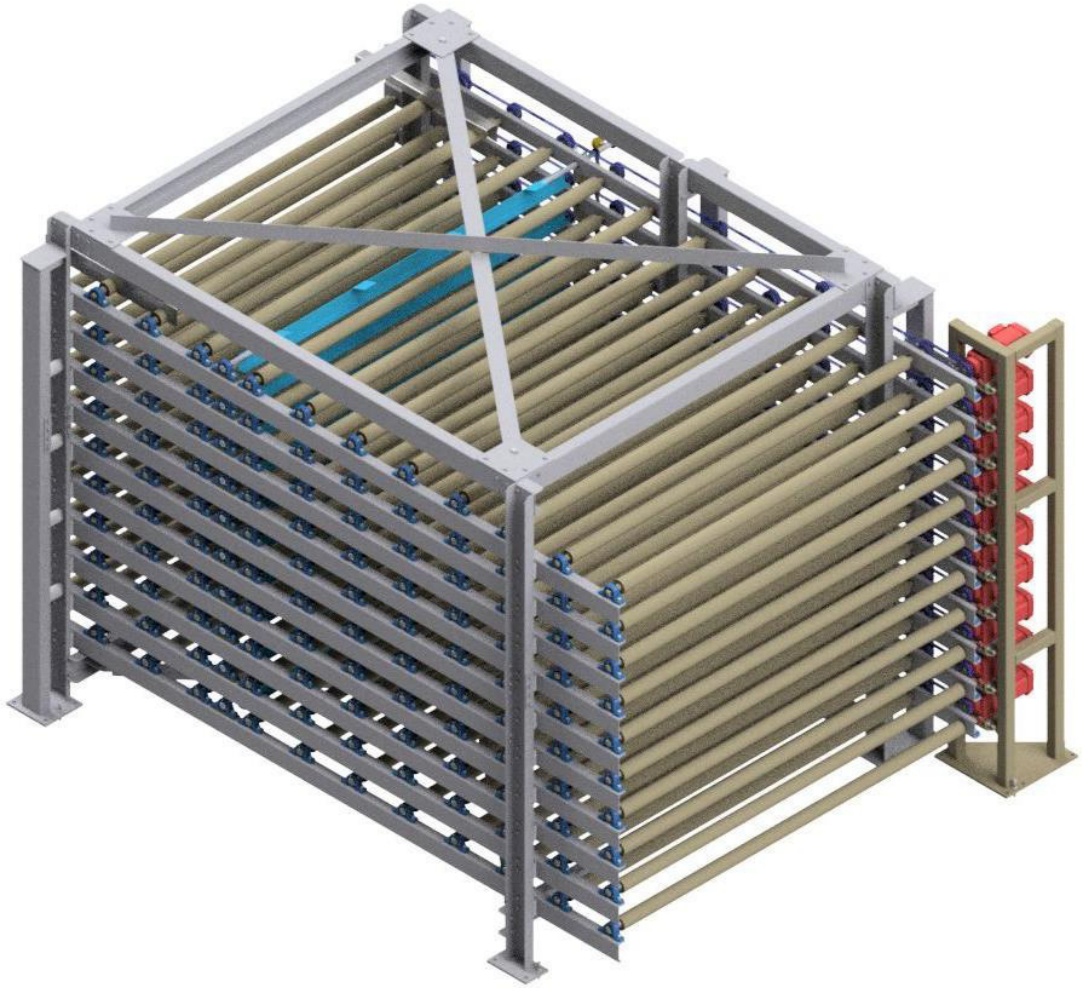


Figure 2: Outfeed Gapping Conveyor

2.1.2 Outfeed Unloading Conveyor

The Outfeed Unloading Conveyor halts the board, initiates the unloading sequence, and then releases the board at regular intervals. The unloading decks must operate at a speed synchronized with the gapping decks (mid-speed unloading) to facilitate smooth acceleration towards the outfeed gates. Once the board reaches the outfeed gate sensors, the unloading decks reduce to low speed and eventually stop when the board is fully positioned at the gate. This process is controlled by a timer that is activated by the leading edge of the board triggering the deck switches. The Outfeed Unloading Conveyor resumes high-speed operation when the designated gate is ready, rapidly conveying the board onto the Cascade Conveyor.

Figure 3: Outfeed Unloading Conveyor

2.1.3 Cascade Conveyor

The Cascade Conveyor is an inclined segment of the conveyor system that transfers boards from multiple decks to a single conveyor positioned at the operational level of the takeoff. It is situated immediately downstream from the Outfeed Gapping and Unloading Conveyors.

The Cascade Conveyor decks operate with minimal control. Once activated, the cascade runs at a constant speed, synchronized with the high speed of the unloading decks. The decks continue running until the zone is deactivated, an emergency stop condition occurs, or the takeoff enters a backup state, with boards halted on the Dry Transfer 1.

.

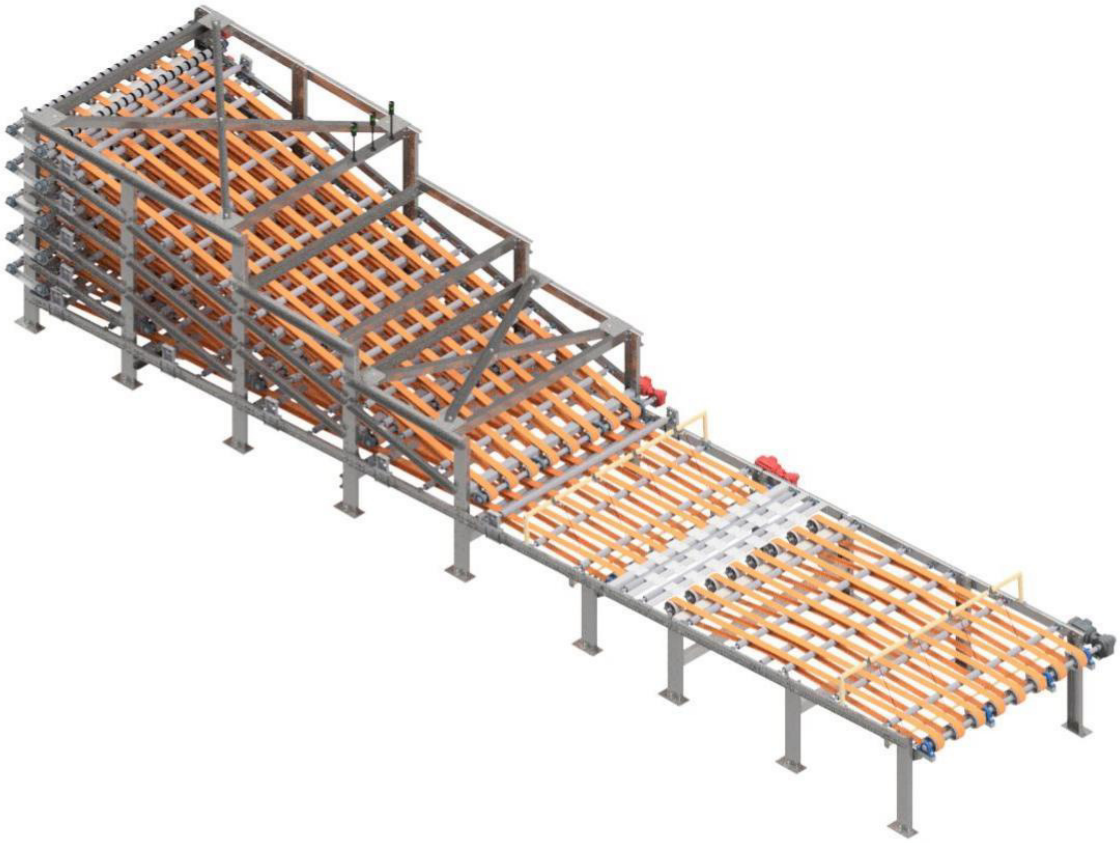


Figure 4: Cascade Conveyor

2.2 Zone 20 – Dry Transfer 1 to Reject Feedback Discharge Chain Conveyor

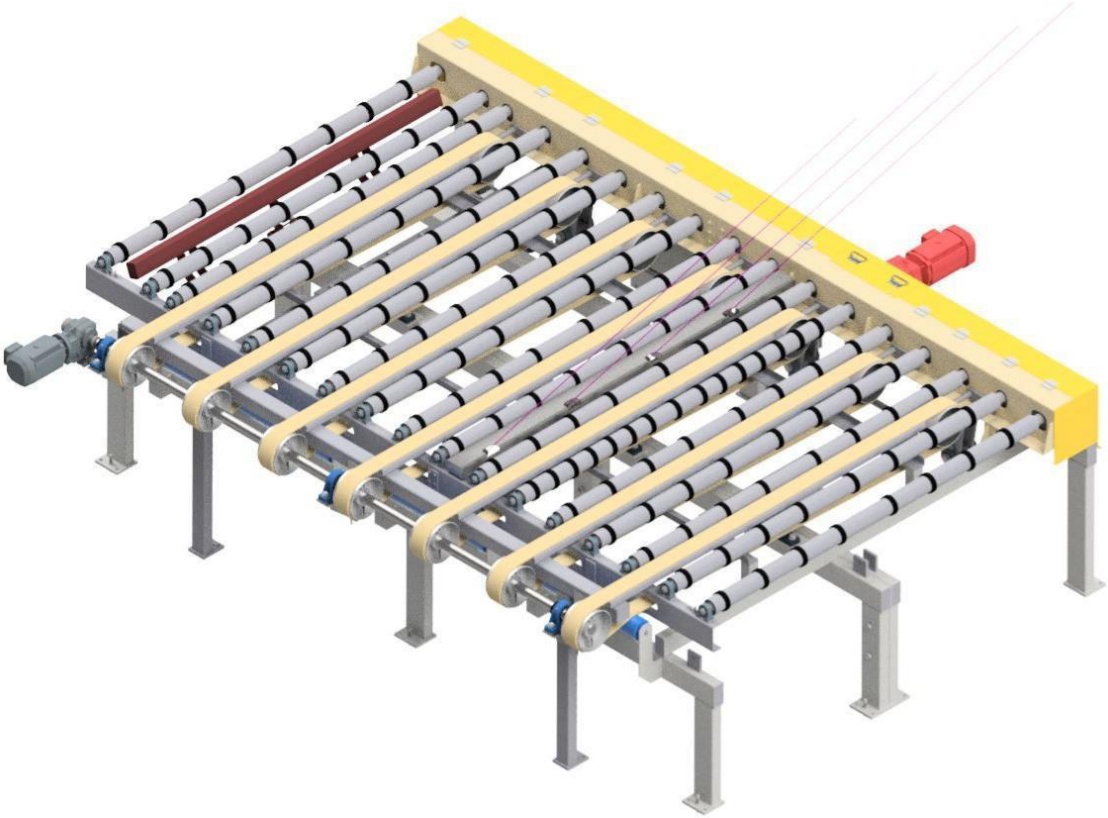
2.2.1 Dry Transfer 1

The Dry Transfer 1 system comprises a set of transfer belts and a height-adjustable roller table. Under normal operating conditions, it transfers boards to the Dry Transfer Bridge Conveyor, which subsequently feeds into the Dry Transfer 2 system. In the event of an upset condition, boards are redirected to the Dry Transfer Reject Feedback system.

During operation, the roller table is typically in the raised position, ready to receive boards. If the reject function is inactive, the board continues to the Dry Transfer Bridge Conveyor and then to Dry Transfer 2. If the reject function is activated, the board stops at the end position, the roller table lowers, and the belts transport the board to the reject area.

The Reject Feedback Station is designed to manage boards that would otherwise be discarded during a system backup caused by various upset conditions. This station monitors the downstream board flow and includes features that allow operators to manually activate the reject function. Rejected boards can either be retrieved by a forklift or reintroduced into the system via the feedback mechanism.

The process monitors board flow continuously, enabling the re-entry of rejected boards into the production line during detected gaps or in bulk when the system is shut down



.

Figure 5: Dry Transfer 1

2.2.2 Dry Transfer 1 Reject Feedback Belts 1

The Dry Transfer 1 Reject Feedback Belts 1 feeds board to or receives board from the Dry Transfer 1 Reject Feedback Belts 2.

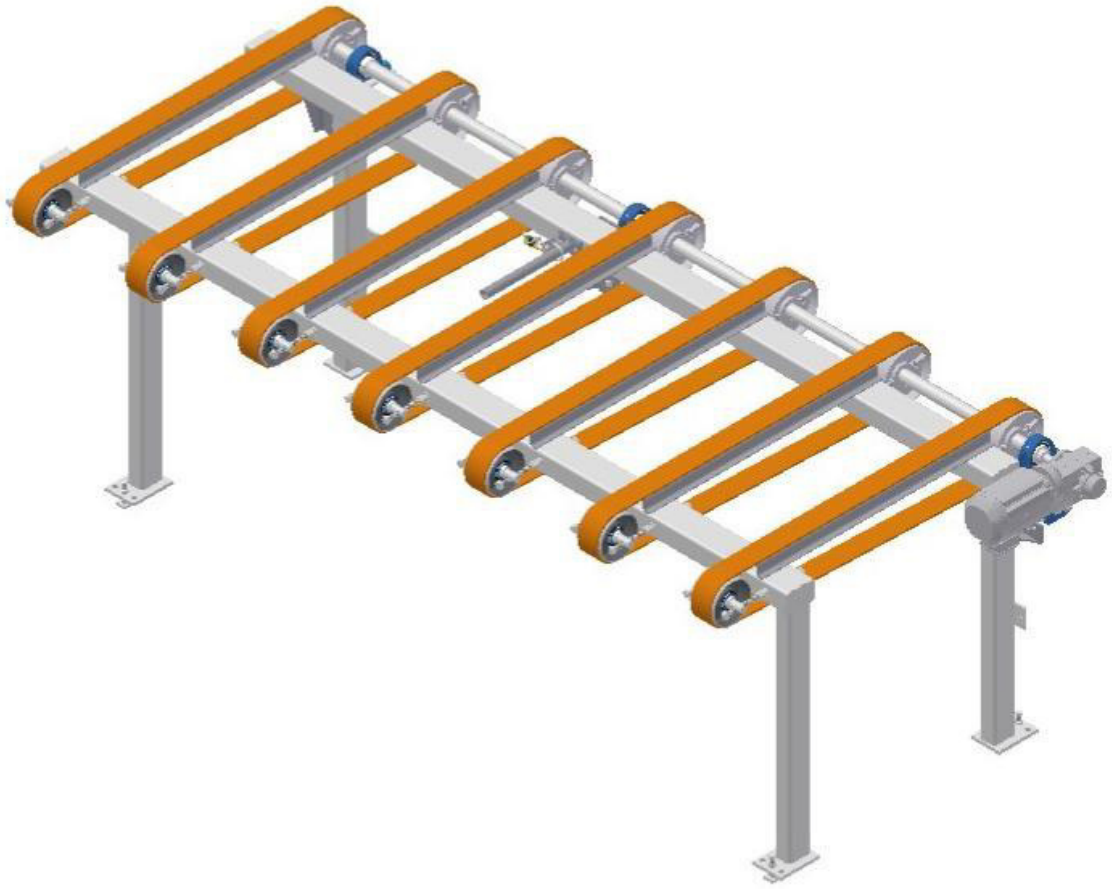


Figure 6: Dry Transfer 1 Reject Feedback Belts 1

2.2.3 Dry Transfer 1 Reject Feedback Belts 2

The Dry Transfer 1 Reject Feedback Belts 2 feeds board to or receives board from the from Reject Feedback Chain Conveyor/Scissor Table and Reject Feedback Evener.

Figure 8: Dry Transfer 1 Reject Feedback Belts 2

2.2.4 Reject Feedback Evener / Reject Feedback Chain Conveyor/Scissor Table

The Reject Feedback Evener, Reject Feedback Chain Conveyor/Scissor Table receive board from the Dry Transfer 1 Reject Feedback Belts 2 and collectively work together to stack and even long board when it is rejected. The distance between the Reject Feedback Evener and the position of the Reject Feedback Evener beam self-adjust to the long board width and length setpoints. The Reject Feedback Chain Conveyor /Scissor Table lower every time a long board drops onto the chain conveyor to build stacks of rejected board.

When long board is to be fed back, the Reject Feedback evener beam and eveners move out of the way while the Reject Feedback Chain Conveyor /Scissor Table raise to the feedback height. The Reject Feedback Suction Cups then feedback the long board onto the Dry Transfer 1 Reject Feedback Belts 2.

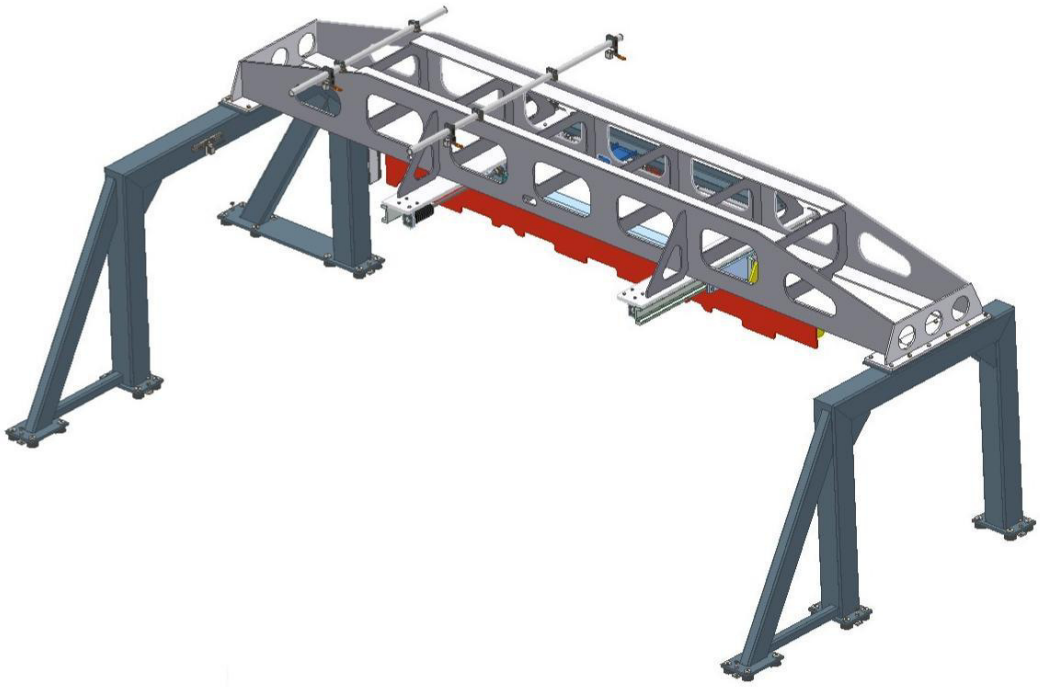


Figure 9: Reject Feedback Evener

2.2.1 Reject Feedback Chain Conveyor/Scissor Table

A hydraulic lifting table with mounted chain conveyor is installed in a pit. If reject is on the chain conveyor takes over the lift to the stack take-up position and transfer it to the Reject/Feedback Discharge Chain Conveyor for forklift take away.

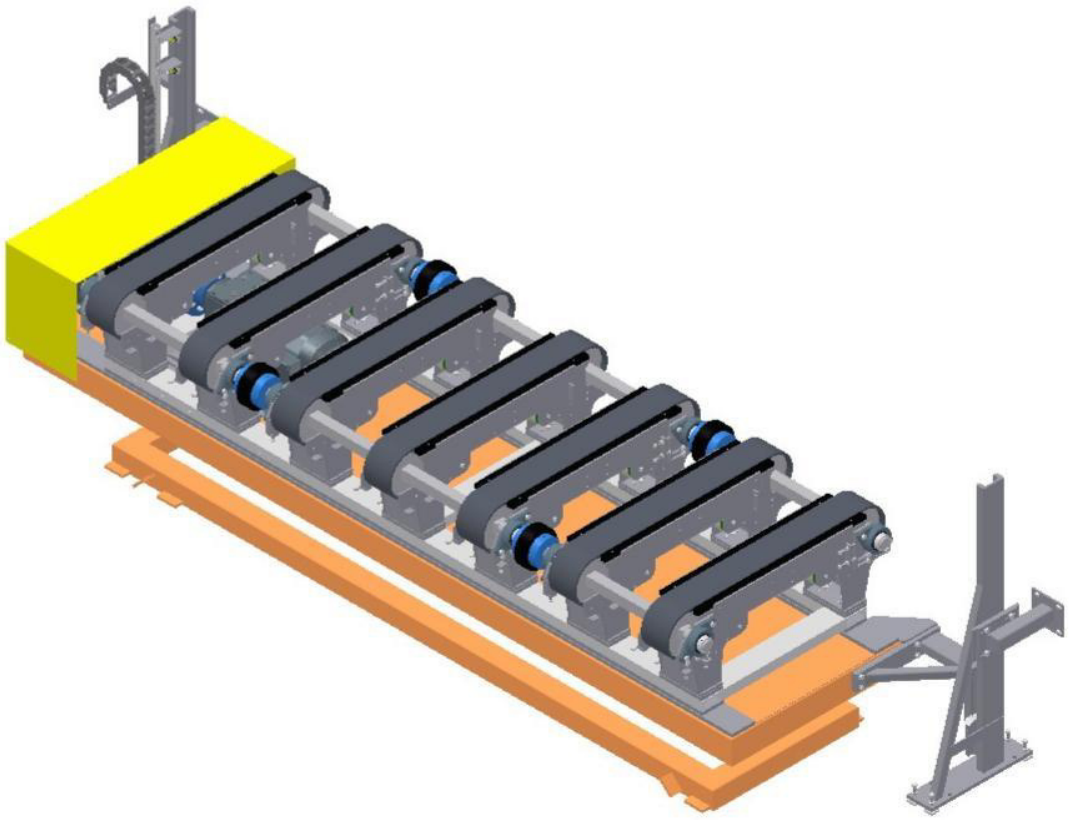


Figure 10: Reject Feedback Chain Conveyor/Scissor Table

2.2.2 Reject Feedback Suction Cups

The Reject Feedback Suction Cups pick up board from Reject Feedback Chain Conveyor/Scissor Table and place it on the Dry Transfer 1 Reject Feedback Belts 2 when feeding back the board.

Figure 11: Reject Feedback Suction Cups

2.2.3 Reject/Feedback Discharge Chain Conveyor

When feedback is turned off, the Reject/Feedback Discharge Chain Conveyor typically receives stacks of rejected board from the Reject/Feedback Chain Conveyor/Scissor Table. When feedback is turned on, good quality long board stacks can be loaded onto the Reject/Feedback Chain Conveyor/Scissor Table for automatic feedback.

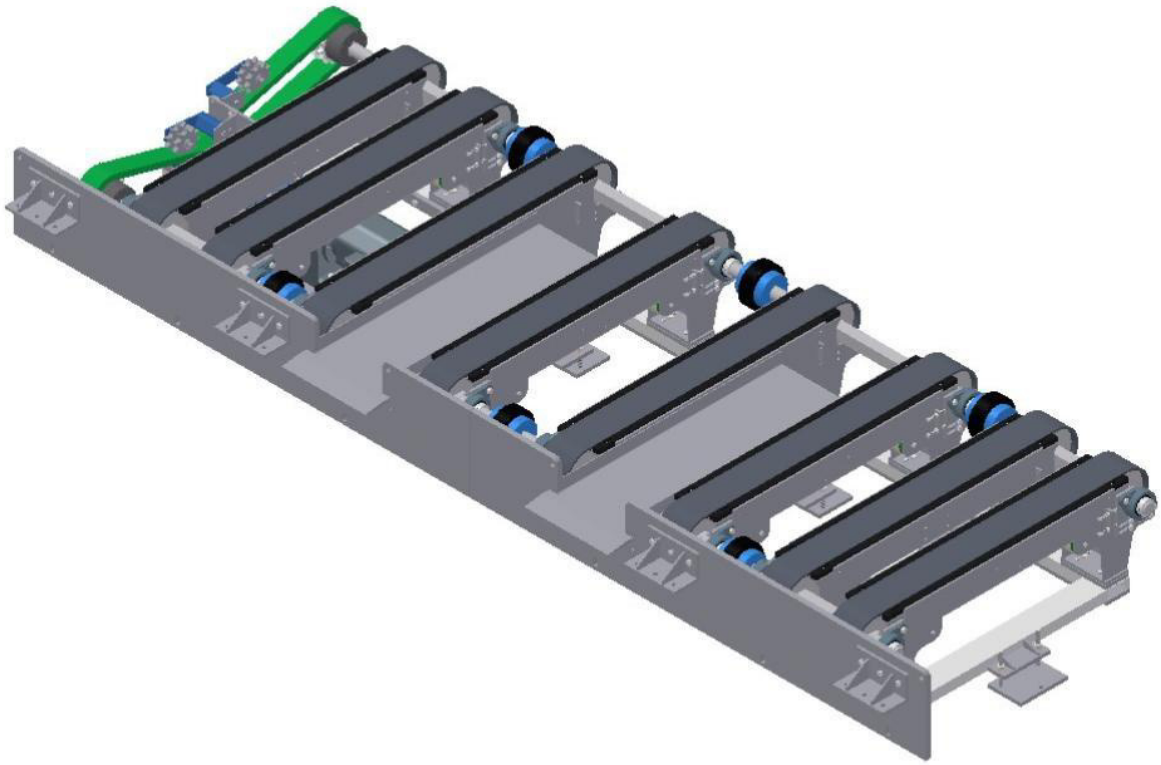


Figure 12: Reject Feedback Discharge Chain Conveyor

2.3 Zone 30 – Dry Transfer Bridge Conveyor to Corner Reject

The Dry Transfer zone transfers board to Booker Staging Conveyor, or to the Corner Reject. The normal condition is to transfer to Booker Staging Conveyor.

2.3.1 Dry Transfer Bridge Conveyor

The Dry Transfer Bridge Conveyor consists of a set of rollers. The Dry Transfer Bridge Conveyor feeds boards to the Dry Transfer 2.

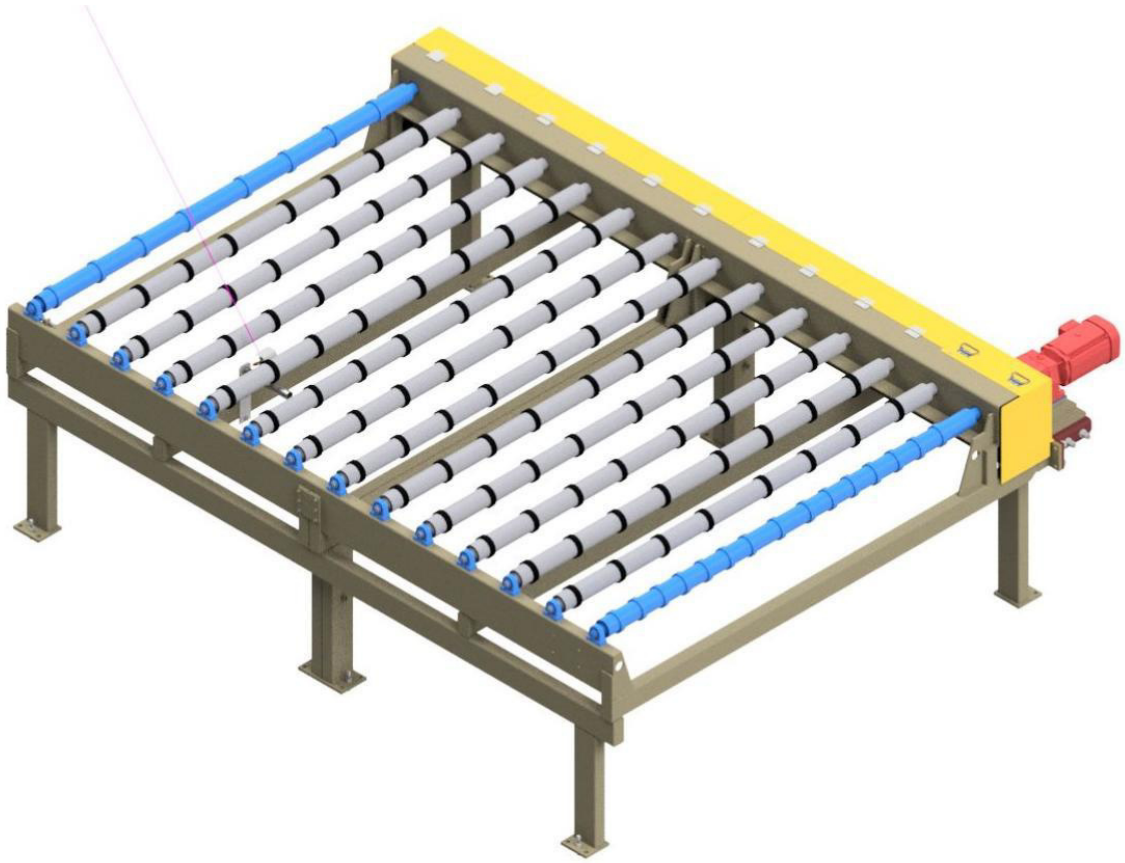


Figure 13: Dry Transfer Bridge Conveyor

2.3.2 Dry Transfer 2

The Dry Transfer 2 consists of a set of transfer belts and a roller table, which can be raised and lowered. During normal operation the Dry Transfer 2 feeds to Booker Staging Conveyor, during an upset condition board is sent to the Corner Reject.

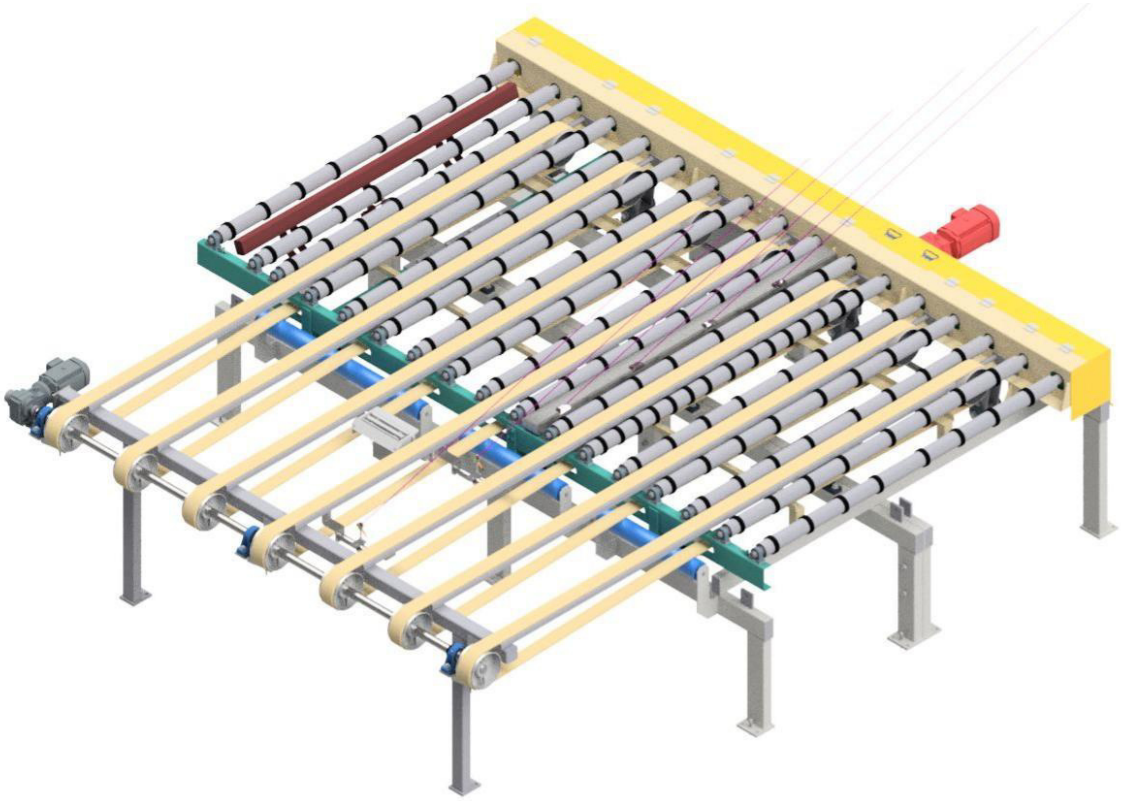


Figure 14: Dry Transfer 2

2.3.3 Corner Reject

The Corner Reject consists of a set of belts which allows board to be rejected. This is achieved manually, by an operator, or automatically by the PLC when boards are overlapped or badly staggered.

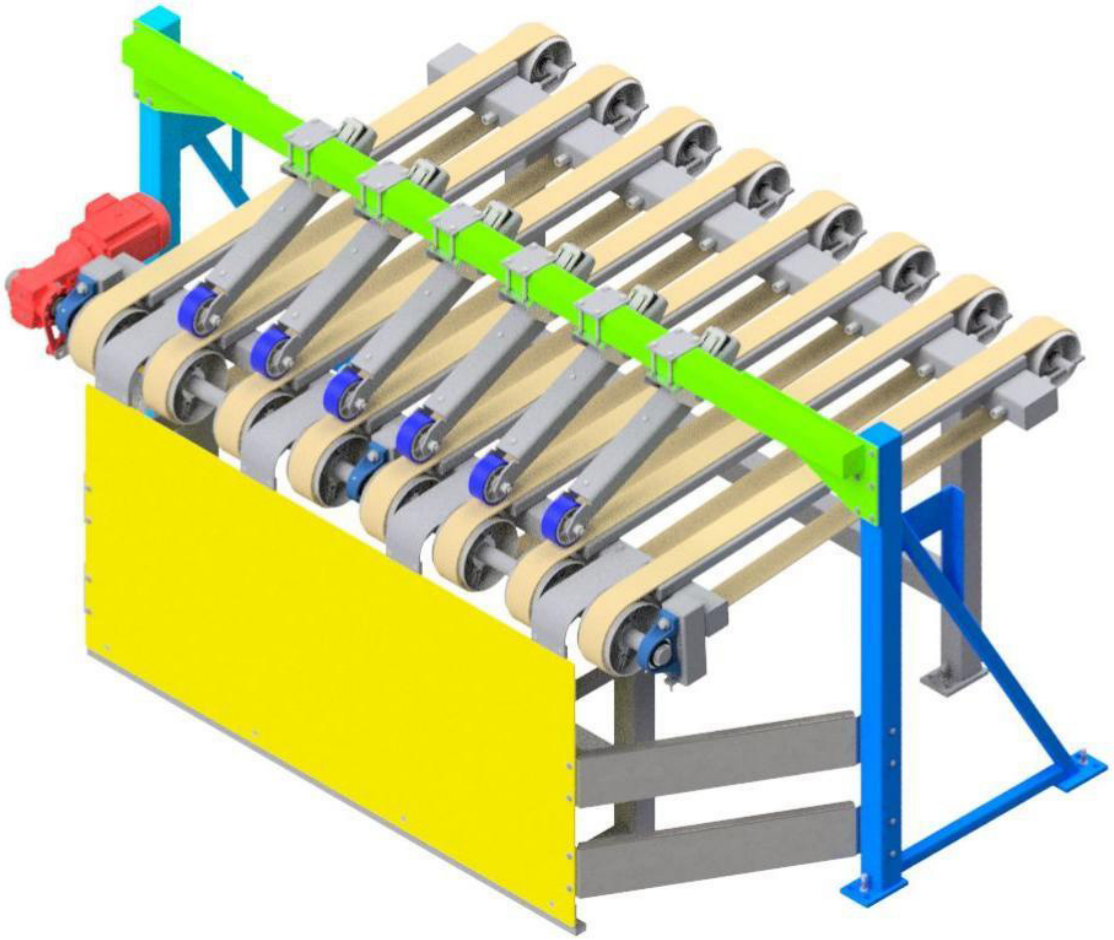


Figure 15: Corner Reject

2.4 Zone 40 – Booker Staging Conveyor to Finishing Saw

The zone starts by transferring boards from Booker Staging Conveyor to Booker and booking a pair of boards face-to-face to protect the finished surface from damage. After booking, the ends are trimmed by the end trim saws and then the boards are cut on center from the center saw to saleable lengths.

2.4.1 Booker Staging Conveyor

Booker staging conveyors run when the zone is on. It will feed the booker.

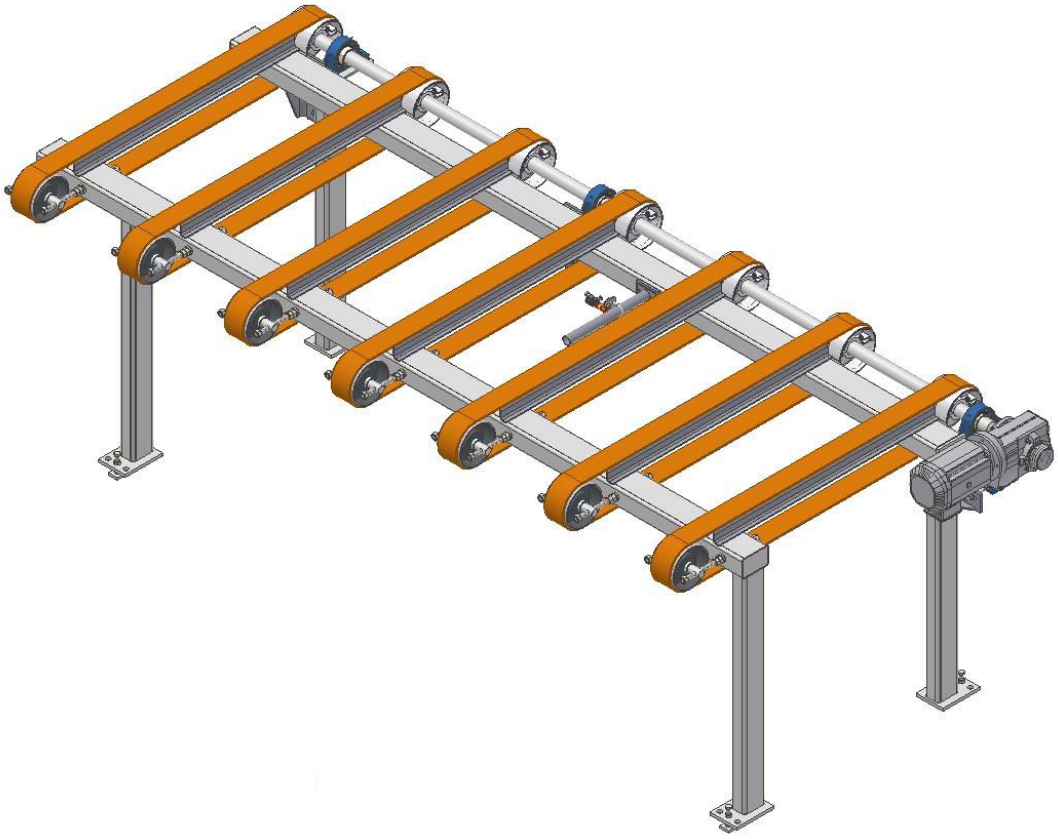


Figure 16: Booker Staging Conveyor

2.4.2 Booker

The Booker has a set of arms and a set of belts to:

- Convey the boards side-by-side
- Stop and center the boards
- Raise both boards up with its arms
- Raise the second board further up than the first so that it tips over onto the first, resulting in a pair of boards stacked face-to-face.

The Booker cannot handle overlapped and badly staggered boards and will feed these to the Corner Reject, otherwise in normal operation board will be fed to the downstream Finishing Saw Staging Conveyor.

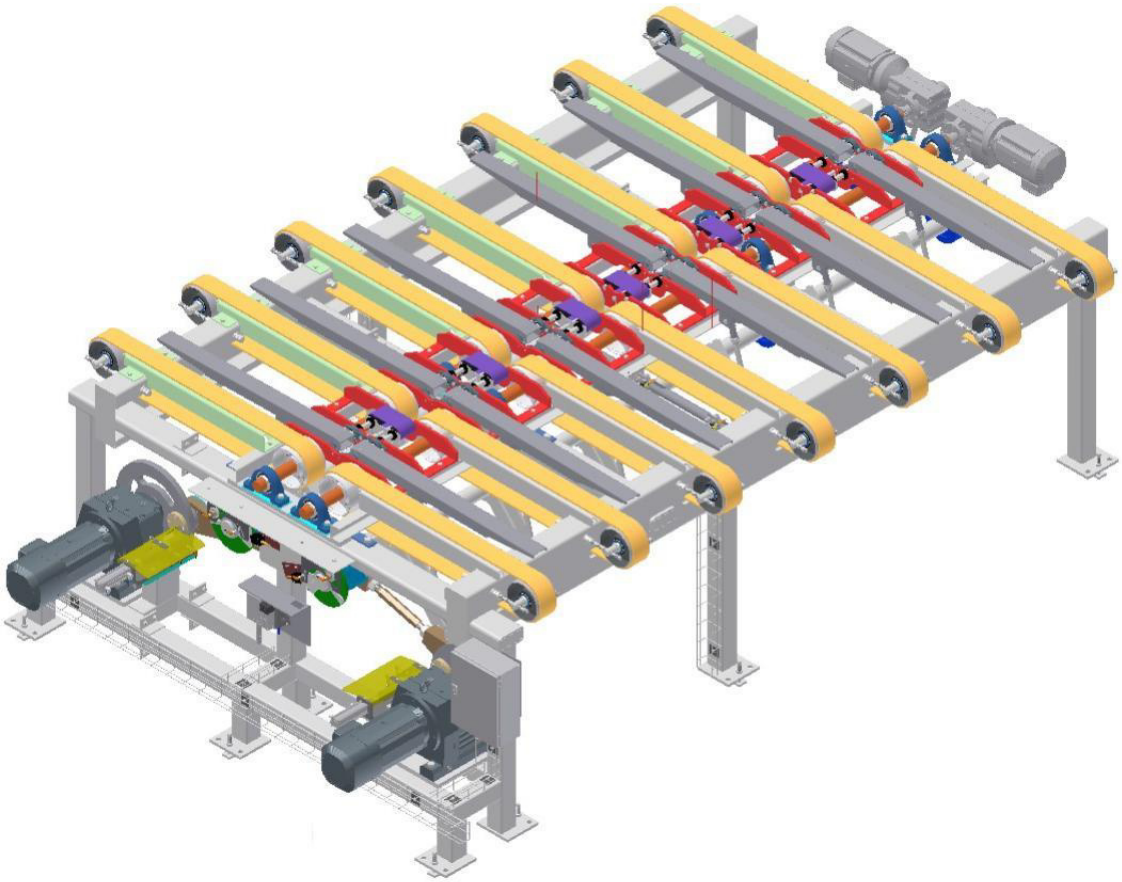


Figure 17: Booker

2.4.3 Finishing Saw Staging Conveyor

Finishing Saw Staging conveyor will feed the Finishing Saw.

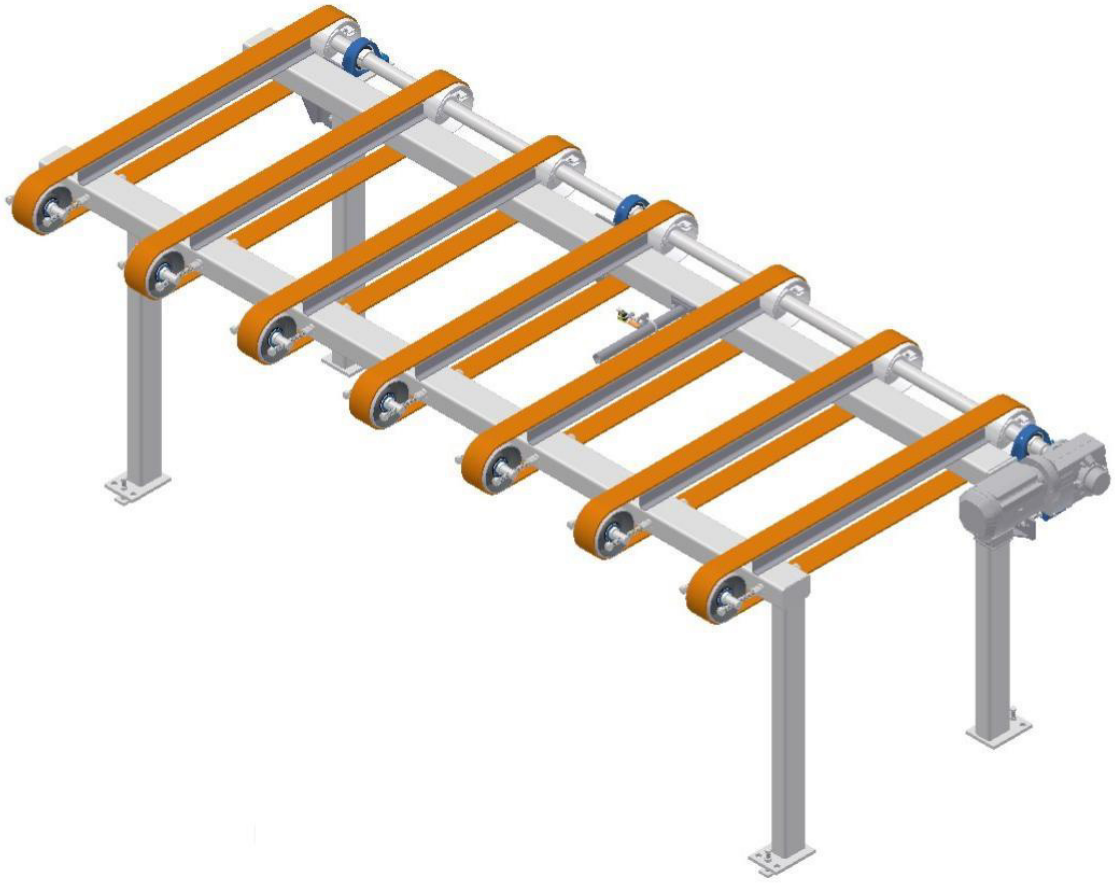


Figure 18: Finishing Saw Staging Conveyor

2.4.4 Finishing Saw

The Finishing Saw is engineered to cut boards to desired lengths. The Finishing Saw system is comprised of two main sections; the End Trim and the Center Saw. The purpose of the End Trim Section is to create a smooth finished cut on the ends of the board. The purpose of the Center Saw Section is to cut the board into two equal length pieces. Both sections of the Finishing Saw are composed of several devices to ensure the board stack is cut square and to an accurate length.

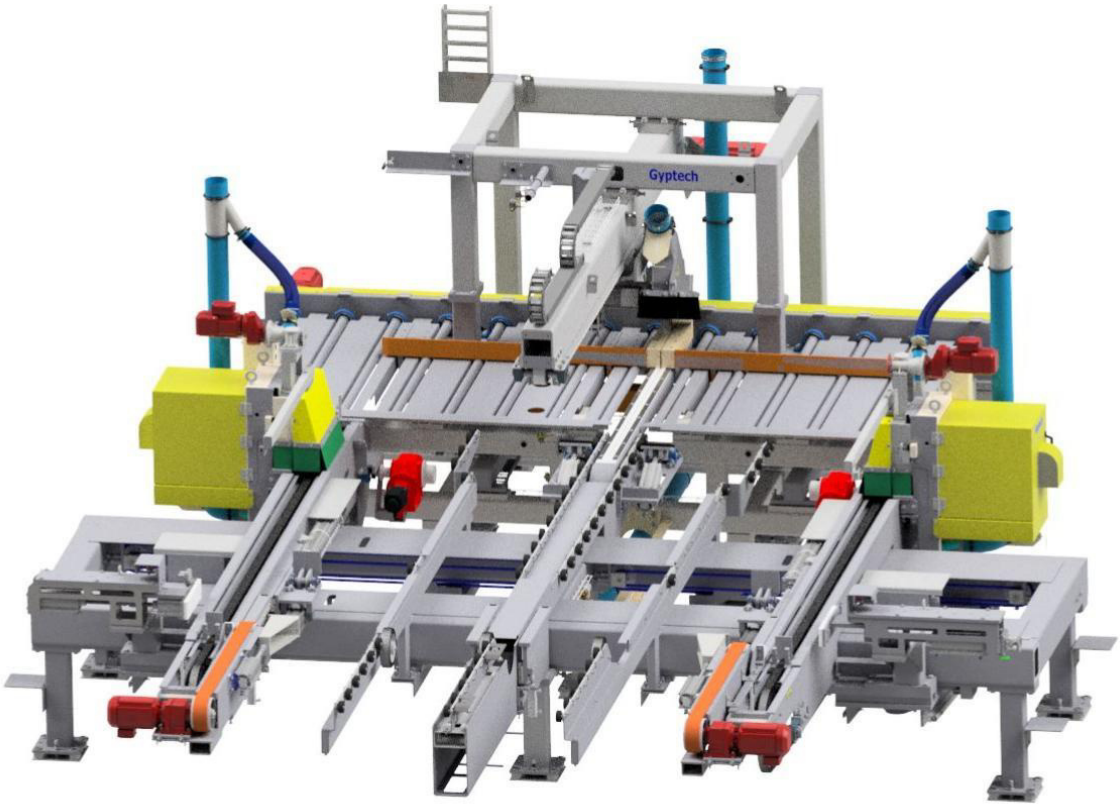


Figure 19: Finishing Saw

2.5 Zone 50 – Holding Conveyor to Packing Line

2.5.1 Holding Conveyor

Holding conveyor run when the zone is on. When there is a backup situation (i.e. if there is a downstream issue), they can hold a single pack of boards until the issue is resolved. Holding Conveyor supplies boards to Cross Transfer.

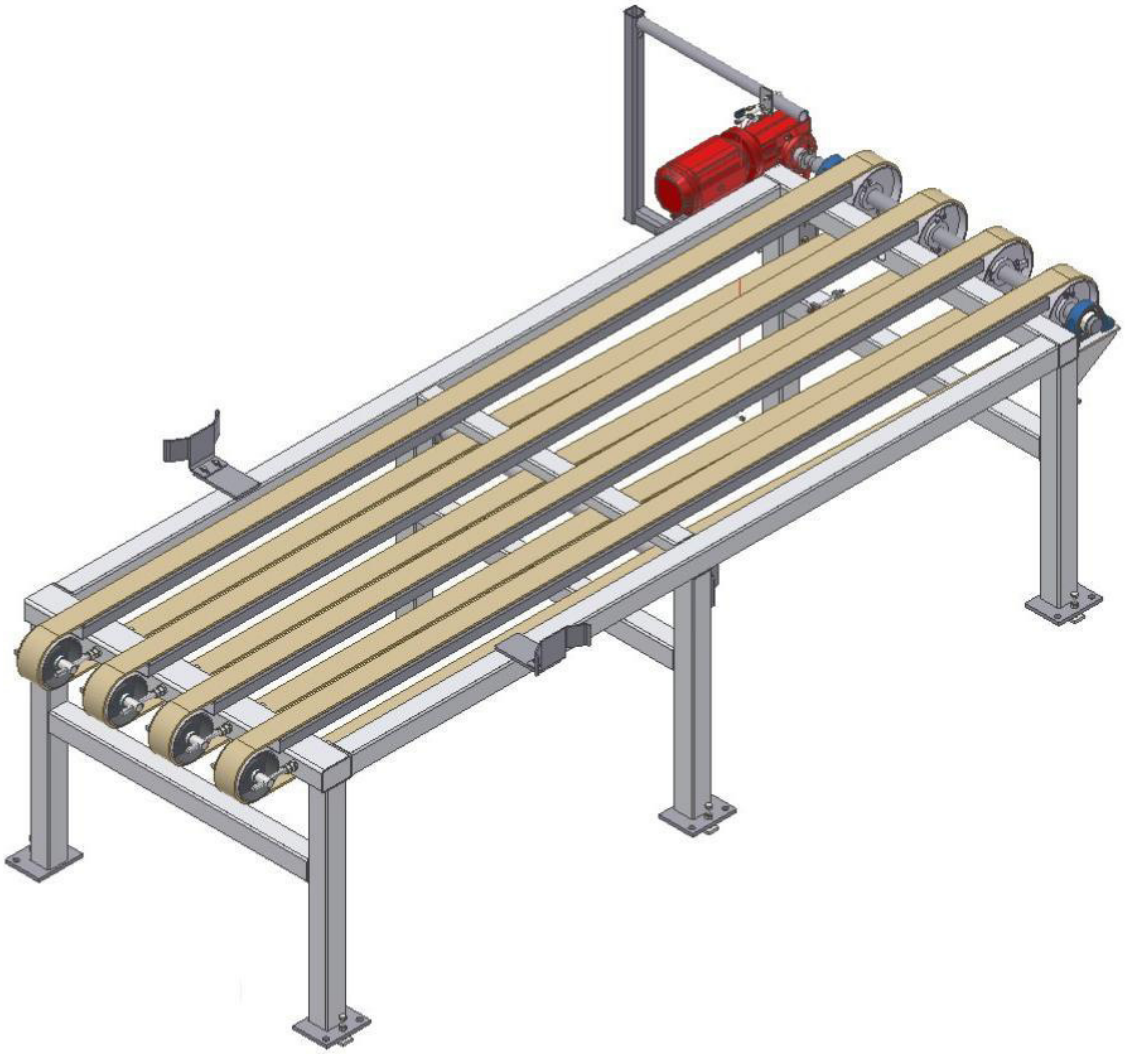


Figure 20: Holding Conveyor

2.5.2 Cross Transfer

Cross transfer consists of a series of transfer belts and a roller table with adjustable vertical positioning to achieve a square change of board direction. Cross Transfer supplies boards to Stacker Staging Conveyor

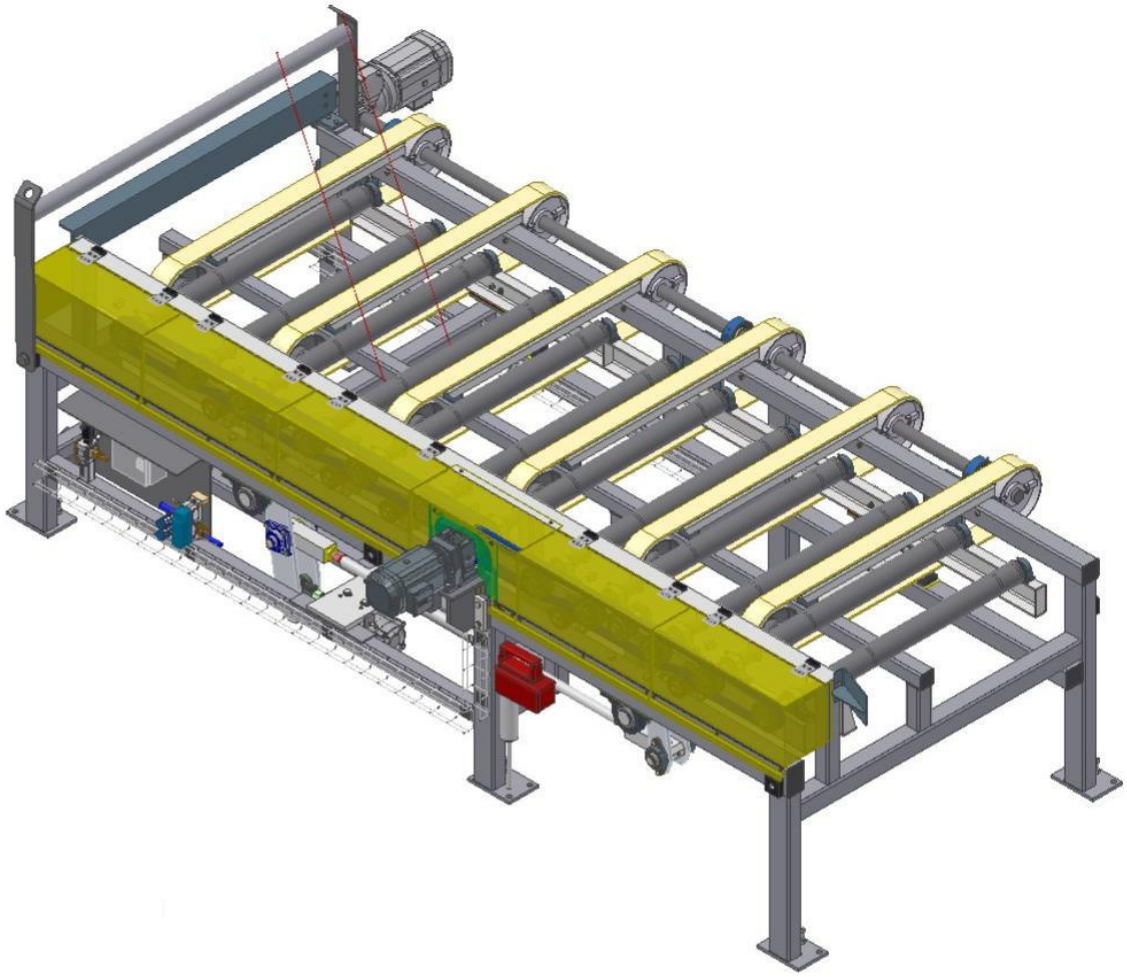


Figure 21: Cross Transfer

2.5.3 Stacker Staging Conveyor

Stacker Staging Conveyor will take the mini packs from the Cross Transfer to the Finger Stacker. This Staging Conveyor provides backup capability during the finger stacker unloading cycles and facilitates better access between dry board handling and packaging equipment.

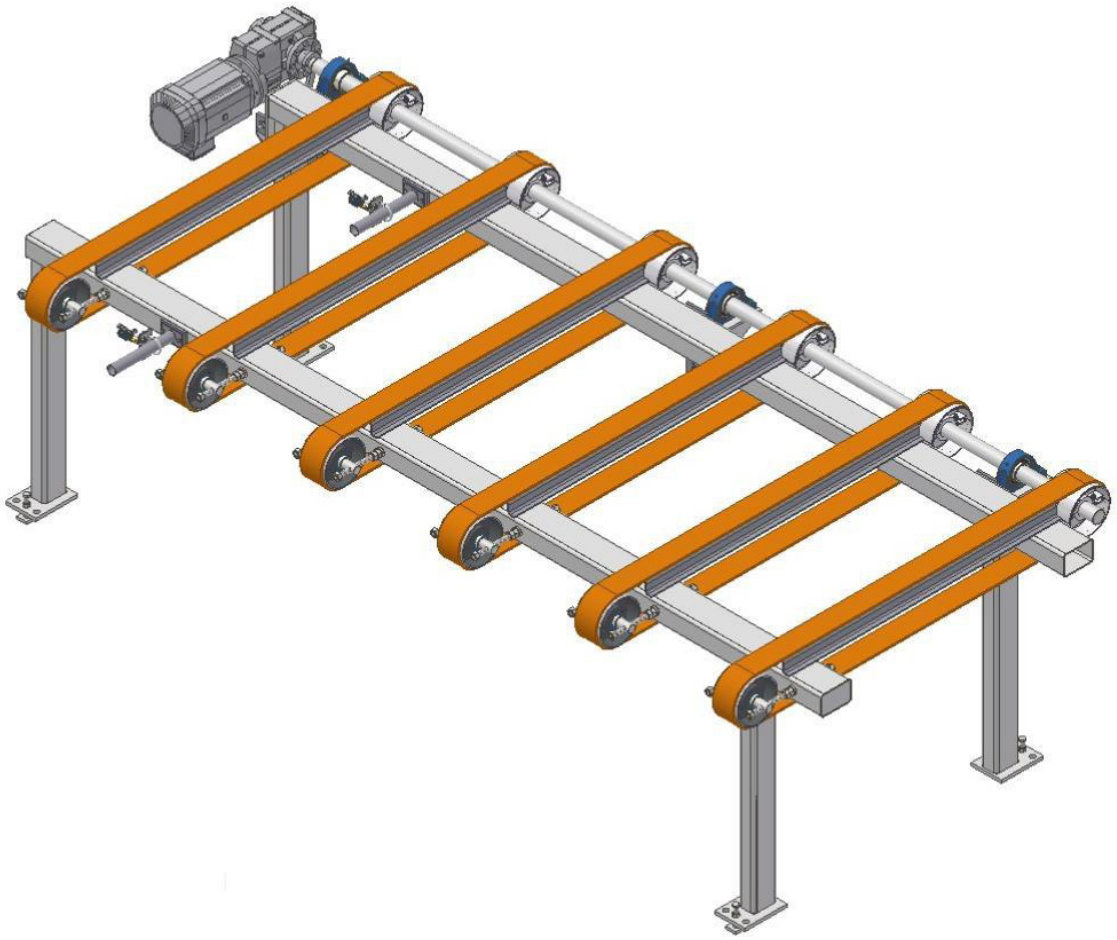


Figure 22: Stacker Staging Conveyor

2.5.4 Finger Stacker

The finger stacker conveyor consists of a hinged belt conveyor that is raised and lowered to facilitate stacking. Booked boards or “mini packs” can be fed from the flat belt directly into the adjacent stacker scissor table. The first “mini pack” of a stack stops on the belts. Then the belts lower the boards on to the fingers and the fingers are run forward, suspending the boards over the scissor table. The belts are then raised, and side pushers hold the boards back as the fingers are retracted, dropping the boards onto the stack accumulating on the scissor table. The complete unit is then discharged downstream towards the Stacker ETO Conveyor and Packing Line (Supplied by others). The Finger Stacker is capable of stacking boards onto a pallet that is staged onto the Pallet Slat Conveyor 1 and Pallet Slat Conveyor 2.

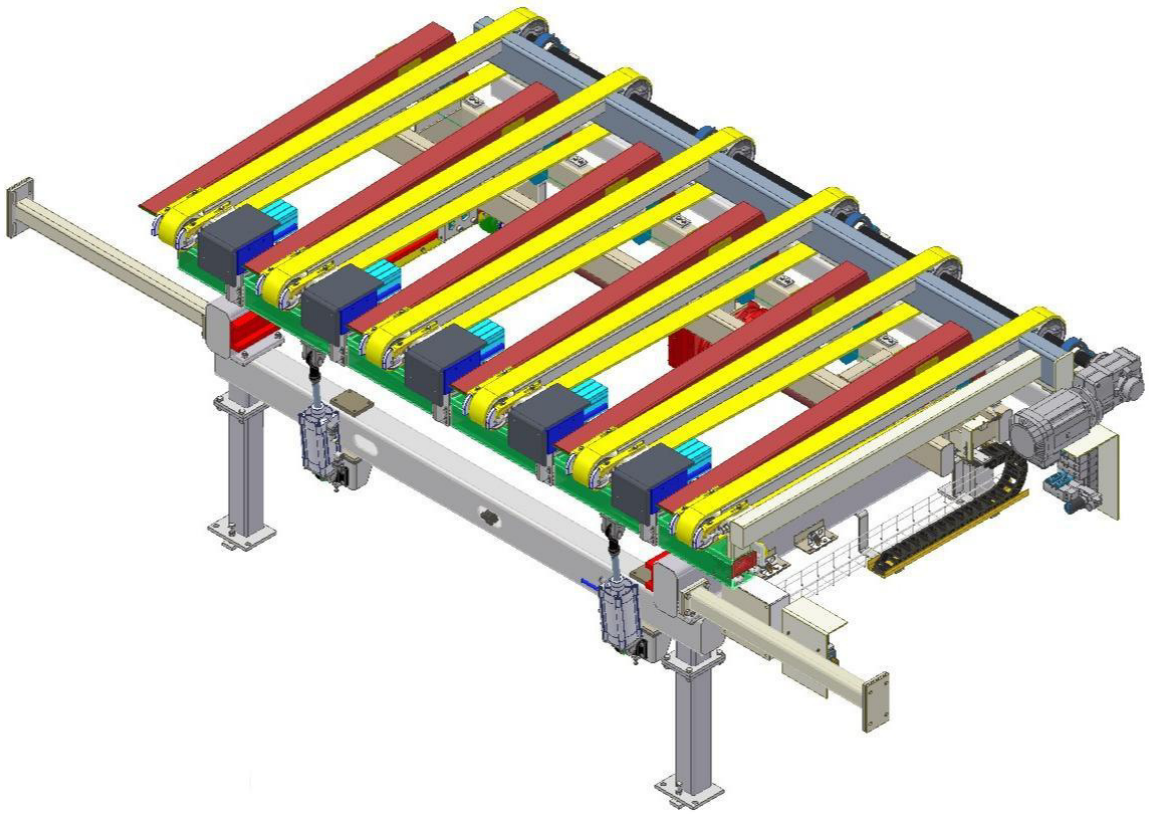


Figure 23: Finger Stacker

2.5.5 Stacker Evener

Squaring devices are used to build accurately aligned stacks. A solid beam will be installed across the hydraulic lift table which builds the bases for long edge board alignment. The beam will also carry the pneumatically operating end pushers. They can be automatically adjusted to the board length by motorized screw.

The solid rail guided beam will be automatically positioned according to the board width.

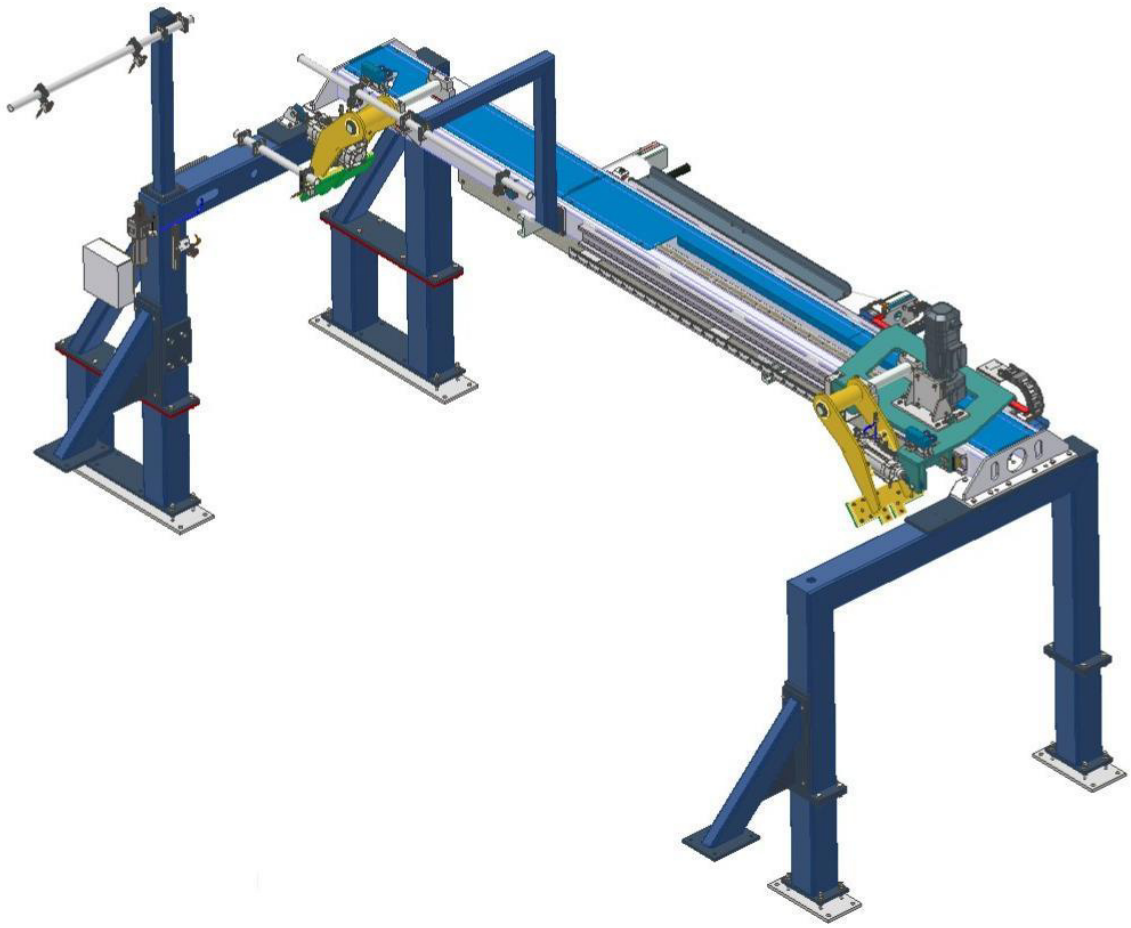


Figure 24: Stacker Evener

2.5.6 Stacker Scissor Table / Stacker Lift Chain conveyor

A hydraulic lifting table will be installed in a pit. The scissor table is of heavy-duty design and utilizes hydraulic systems for high and low speed travel. On top of the table will be steel dunnage which supports the bottom of the unit during the unit stacking cycle.

The hydraulic lift table lowers the stacked unit onto the finger stacker discharge modular chain conveyor. Once the unit has been conveyed clear of the lift, the lift table will travel back into stacking position to start the next board stacking cycle.

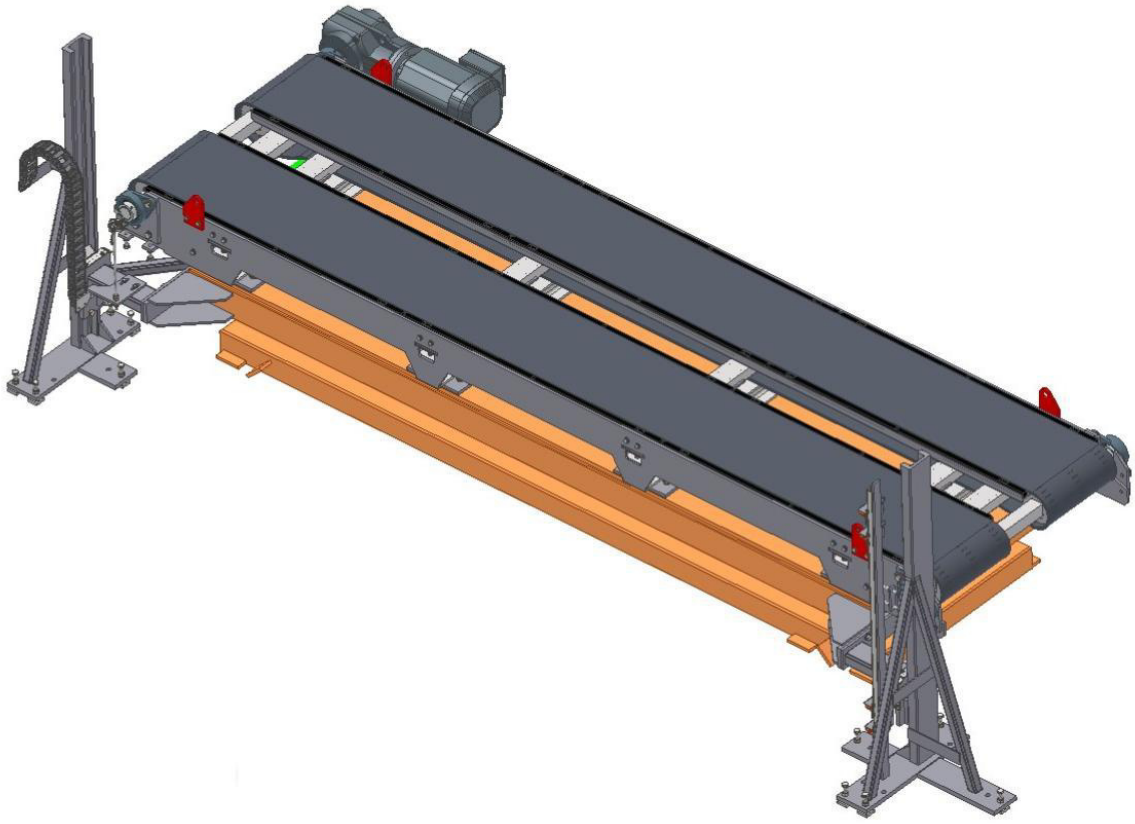


Figure 25: Stacker Scissor Table / Stacker Lift Chain Conveyor

2.5.7 Hand Operated Pallet Loading System

Hand Operating Pallet Loading System includes Pallet Slat Conveyor 1, for pallet alignment and loading on the Conveyor, Pallet Slat Conveyor 2 for staging and feeding pallets to Stacker Scissor Table / Stacker Lift Chain Conveyor, Electrical Light Curtains and Safety Switches for hand operating pallet loading controls.

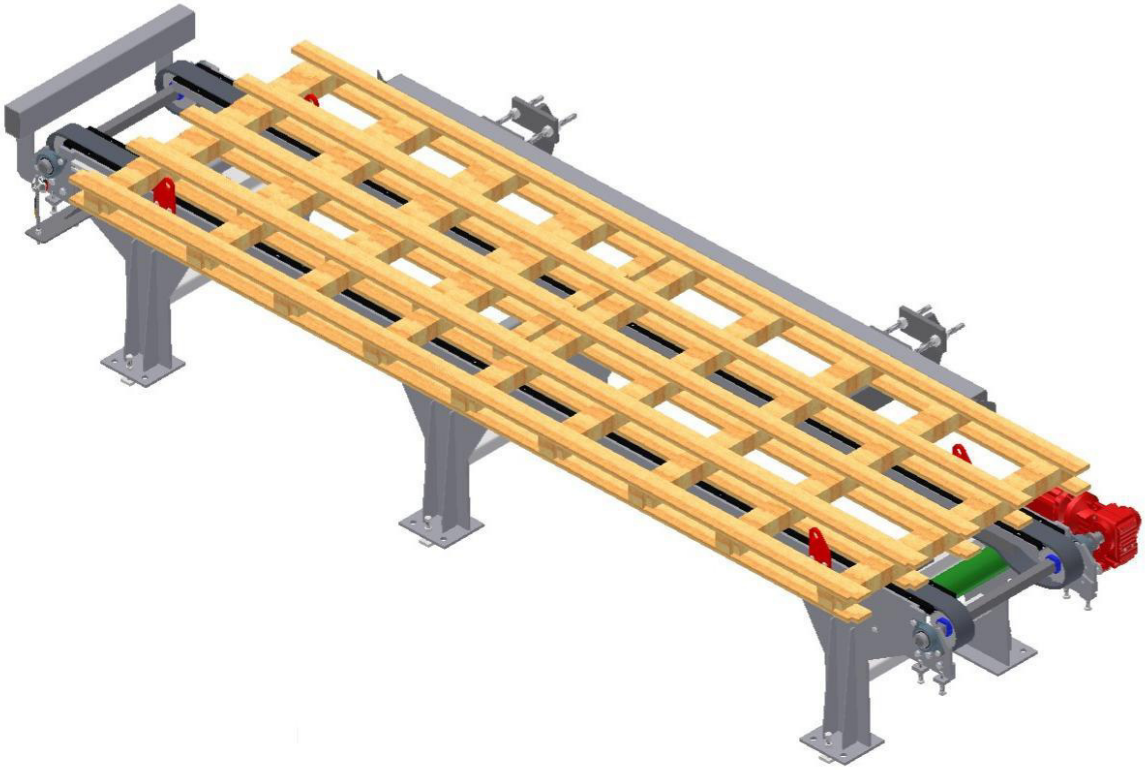


Figure 26: Pallet Slat Conveyor 1

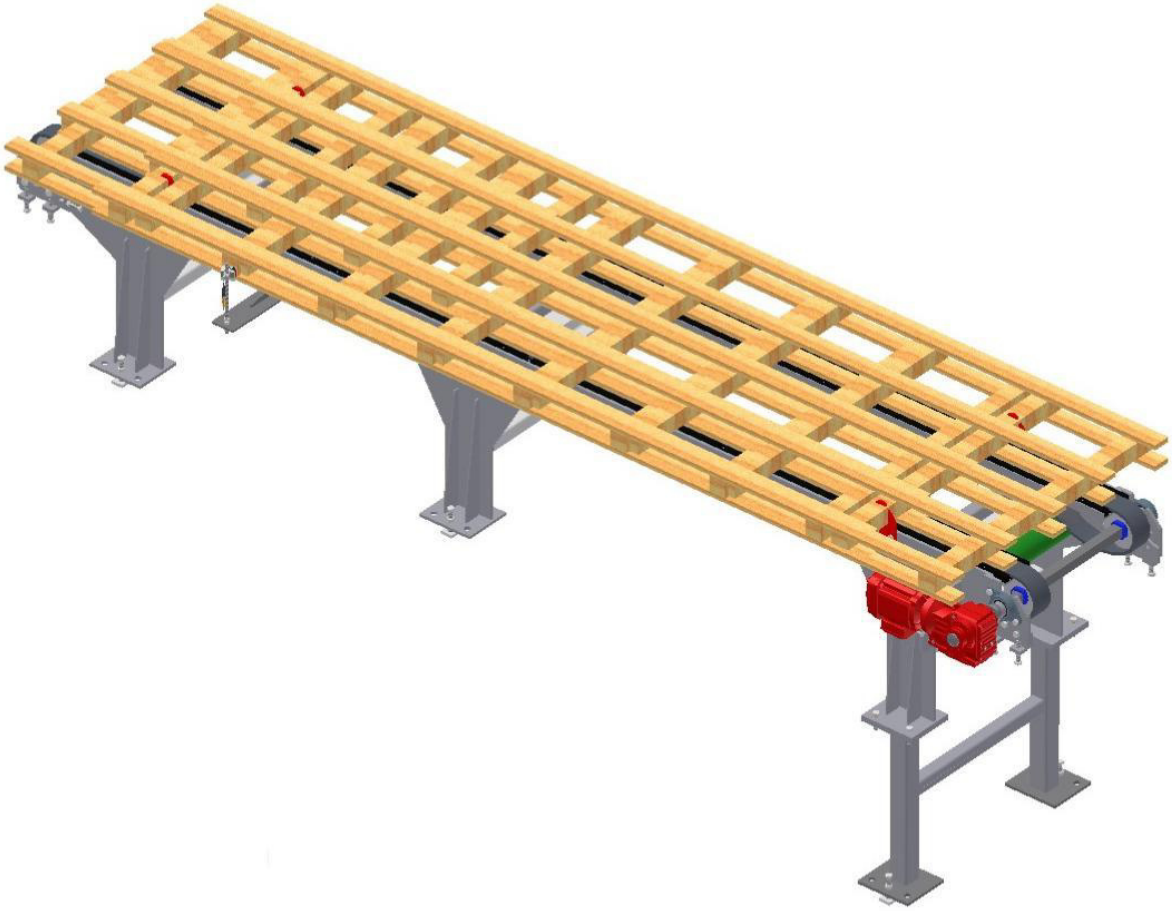


Figure 27: Pallet Slat Conveyor 2

2.5.8 Stacker ETO (Emergency Takeoff) Conveyor

The normal condition is for the ETO conveyor to convey board to the Packing Line. If there is a downstream upset, a unit stages at the ETO conveyor for fork truck removal.

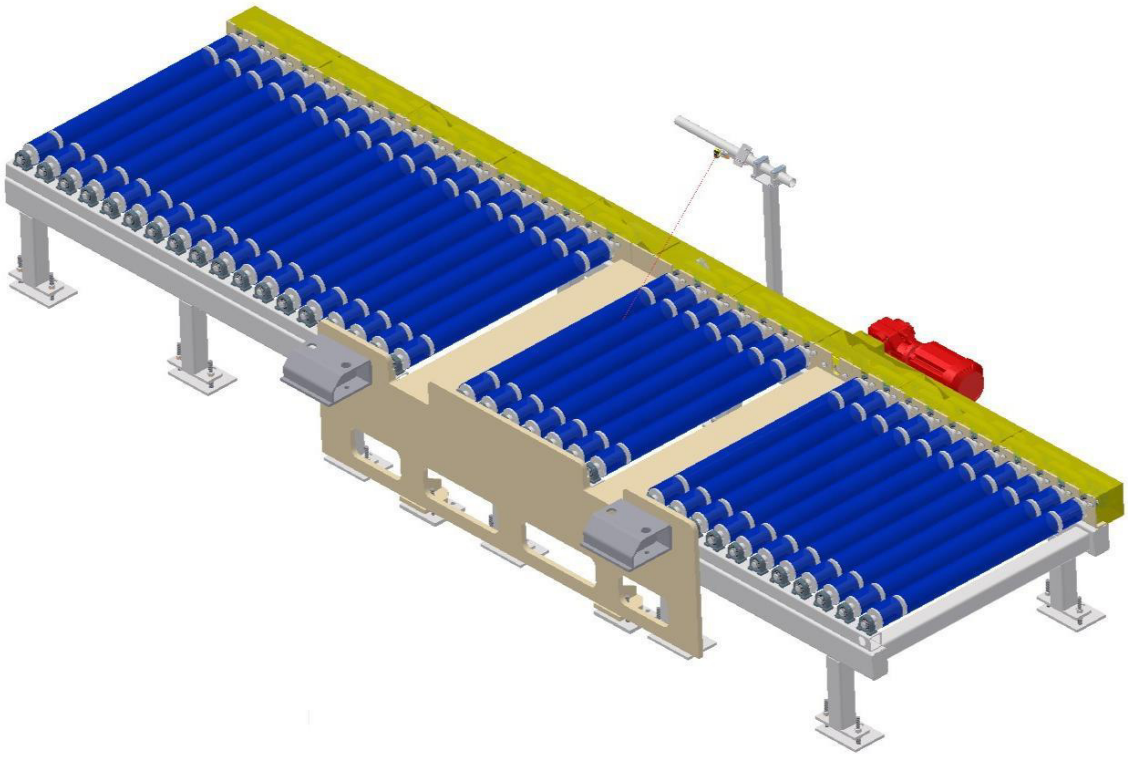


Figure 28: Stacker ETO Conveyor

3 Operator Procedures

3.1 Takeoff Product Sizes

The takeoff handles different sizes of dried board which vary in width and length. The takeoff area receives boards of lengths between 1.8m and 4.0m from the dryer. These boards are processed into final board lengths ranging from 1.8m to 4.0m with widths of 600mm, 900mm, 1200mm, and 1220mm. Board thickness of 6.4mm, 9.5mm, 12.5mm, 15.7mm, 16mm, 20mm and 25mm.

3.2 Starting and Stopping the Takeoff Area

Starting and stopping each zone in the takeoff area is done by a single button located on either the operator control panel or on a graphics screen. The HMI indicates conditions not met prior to starting a zone. Before a zone can be started, these conditions must be met:

- All disconnects in the zone must be closed
- No emergency stop conditions can exist
- No external critical zone process faults can exist
- Zone Safety is ok
- Air pressure needs to be operational

For conditions that fail during operation, the affected motor automatically shuts down and the HMI displays the reason for shutdown. Loss of operational air pressure will not shut down a zone. When a zone is shut down, it remains in a stopping state for several seconds to allow board in transit to stage properly before equipment is shutdown. Activation of any of the emergency stop buttons will shut down the entire boardplant domain. Emergency stop conditions include activation of any emergency stop button.

Zone	Location	Panel No.
10	Outfeed Control Panel P1810A-HSB01	P1810A
20	Dry Transfer 1 Reject/Feedback Control Panel P1820B-HSB01	P1820B
30	TakeOff HMI Panel P1830A-HSB01	P1830A
30	Corner Reject Control Panel P1830B-HSB01	P1830B
50	Stacker HMI Panel P1850A-HSB01	P1850A

Table 2: Emergency Stop Locations

Each zone is a logical, functional collection of motors and devices. To start a zone – that is to say, make it ready for automatic functionality – requires the operator to press the zone start PB. This initiates the zone start sequence. The zone start sequence begins with sounding the area horn as a warning that a zone is starting. The zone on/off pilot light flashes while the zone is starting. Once a zone has started all equipment goes into its auto-ready state and the zone on/off pilot light is lit solid (no flashing).

When a zone is on, pushing the zone start / stop pushbutton on the control panel or the HMI once will turn the area off with a time delay. Pushing the button, a second time while shutting down will shut the zone down immediately. Drives may remain powered, and air pressure may remain. It is still necessary to power down and lock out the zone before entering to perform maintenance. This is the controlled way to turn a zone off and is the preferred method of stopping a zone in a non-emergency situation.

3.3 Automatic Unload Sequence

The automatic unload sequence releases board on a first-in first-out basis. To manually intervene, the operator can use the unload button to change the release order to next in sequence

3.4 Outfeed Hold

The outfeed hold is used to stop boards from unloading when:

- Clearing up problems at the Dry Transfer
- Zone 20 is blocked
- During a length changeover

Note: The outfeed hold function should be used with care since it will back up the outfeed.

To activate the outfeed hold:

1. Press one of the outfeed hold push buttons on the HMI or operator panel near the outfeed. Pushing the button once will turn the sequence on. The light indicates that the outfeed hold function is on, which holds all boards at the gates.
2. Push the button a second time to turn the outfeed hold off manually. After a period of time the outfeed hold function will turn off automatically.

The outfeed hold function stops all the gates from unloading for a pre-calculated period of time. It does not stop the outfeed rolls. Board will continue moving from the dryer up to the gates normally. When the outfeed hold function is turned off, the unload sequence carries on normally, but the gap timer speeds up in an attempt to catch up with the normal board flow out of the Dryer.

3.5 Reject/Feedback

Reject:

- Is turned on by pushing the reject button. It can also be turned on automatically by signal from the outfeed, or if zone 30 is not ready for board or if zone 40 is not ready for board.
- Sends stagger, over length, mismatched or missing stream length sets to the corner reject.
- Can be changed to manual reject by the operator if the auto reject is on by pushing the reject button to change to manual reject. Then the operator will need to turn the reject off.

Feedback:

- Can be turned on by pushing the feedback button if the auto reject is off and the takeoff is ready for board.
- Can be turned off by pushing the feedback button. Feedback will turn off if the reject button is turned on.

- With feedback on and board on the scissor table the operator must push reset/unload button to raise the table, push one board forward so it is partly over-top of the Reject belts, then push the scissor lower button. This will cause the scissor to lower and the belts to start reversing to take board into the system.

3.6 Corner Reject

The corner reject equipment allows board to be rejected before being passed to the Booker and Stacker. An operator can activate the Corner Reject at any time by pushing the reject button or the reject button on the HMI. This will cause the set of boards to reject to the corner reject, unless the transfer belts have started to move the board towards the booker. If the system is backed up and a set is sitting on the transfer in position but not moved, an operator can push a reject button to send the set to reject.

Auto On Condition	Auto Off Condition
Too long	Set passed
Too short	Set passed
Board(s) missing	Set passed
Stagger	Set passed
Rolls start with board	Set passed and Zone 40 ready
Zone 40 Fault	Operator button
Zone 40 off	Zone On and Operator button
Product back up to Outfeed	Zone 10 not backed up

Table 3: Corner Reject List

3.7 Booker

3.7.1 Booker

Board to be booked will travel side-by-side as a pair from the booker staging conveyor as far as the exit belt sensor, time out and stop. The entry belt has a similar timer but as a retentive timer to place the second board leading edge properly for booking, this will close the gap between the boards. When the boards are in position the booker cycle pitch and catch run to place both boards on the catch side face to face, then the exit belt starts with a set delay and set acceleration to not cause the top board to slide.

The operator HMI has an offset set for board positioning in the booker and offsets for the pitch and catch delays for minor adjustment of the sequence timing. A larger number for positioning will place the board closer to the finishing saw.

3.7.2 Booker/Dry Transfer Emergency Cleanout

The booker/dry transfer emergency cleanout function helps to speed up the removal of board following a booker jam. The cleanout function can be turned on by pushing the HMI cleanout button only if zone 40 and 50 are on.

The control is done with two buttons, one that causes belts from the dry transfer to the finishing saw feeder belts to run reverse and the other to cause the transfer rolls to rise and the rolls to run. The booker exit belts and the finish saw feeder belts will run in reverse only if the button is pushed and the booker arms are down. In this operation the buttons operate as jog functions, when the button is released the equipment stops. Pushing the corner reject button will cause the rolls to rise and run. Pushing the corner reject button and the reset button together will cause the belts from the dry transfer to the finishing saw feeder to run reverse.

3.8 Finishing Saw

3.8.1 Pre-Checks

- Equipment is clear of personnel
- Electrical power, disconnects, emergency stops
- Air is on
- Saw doors are closed
- Gates are closed
- No faults, reset if required
- Equipment is okay to start

3.8.2 Start-Up

- Dust collector is running
- Lugs have homed indication ON, if not then home them
- Length is at the proper position, if not change the length
- Hold down wheels are at the proper height
- Saws are running
- Cycle the lugs to check operation of lugs and eveners

3.8.3 Finishing Saw Homing Sequences

The Finishing Saw has two distinct homing sequences, one for the lugs and the other for length adjust. The lug home sequence causes the lugs to move past the home registration sensors, then into the ready position with the matched lug on the opposite side, ready to accept and push board through the saws trimming the ends even and square.

Homing Sequence steps:

1. Inactive, stop motion
2. Stop motion, disarm registrations, end even if needed
3. Reset servo faults if needed
4. Move lagging lug to position equal to other lug if needed
5. Jog lugs off sensors if needed
6. Arm registrations left/right
7. Command to move pocket length but stop on sensor
8. Arm registrations left/right
9. Calculate and move to ready, capture car number
10. Move one lug to match lugs if needed
11. Execute home command to servo
12. Latch on home done bit

The function of the Finishing Saw length adjust is to set up the correct length of the finishing for saws to cut the board to proper length. There are two length adjustments, one left and one right. The operator must use the changeover button along with the proper length set-point to set the finishing saw to the proper length.

The homing sequence consists of moving the length adjust out to the home sensor, moving inward until the sensor clears, then redefining the actual position using the value in the home position register. For the length adjust to move into its correct position, the changeover push button has to be pressed.

3.8.4 Start-Up

- Dust collector is running
- Length is at the proper position, if not Home and/or change the length
- Saw is running
- Cycle the Saw to check operation

3.9 Stacker

3.9.1 Starting up the Stacker Zone

1. Ensure power and compressed air is turned on.
2. Ensure all devices are in the “AUTO” position on the HMI.
3. Check that there are no faults present. If there are acknowledge them using the Alarm Acknowledge button on the panels or on the HMI. If faults do not clear investigate the cause.
4. Ensure the board length and width settings on the machine and on the HMI match the product to be run.
5. Press the “Zone Start” push button to initiate automatic operation. Check that the zone button indicator is on steady, if it is flashing then there is a fault of some equipment is not in auto.
6. Check that the set counter is at the proper setpoint value on the HMI.

3.9.2 Stacker Length Change

1. Enter the new length to be run on the HMI.
2. The illuminated changeover button should begin to flash.
3. Wait until the last old length board is at rest and the even cycle is complete.
4. Press and release the flashing changeover button.
5. The lift will lower, and the conveyor will start.
6. The end stop will travel to the new length position.
7. When the board lift is clear the hoist will rise to the up position.

3.9.3 Length Calibration

If a minor length adjustment is required, of one or two millimeters, then the Stacker Length Offset Setpoint data entry can be entered. Then push the length change button while running board. The Stacker End Stop will move to the new position.

3.9.4 Stacker Cleanout

1. If the stacker needs to be emptied the “Changeover” button will need to be pushed and held for 2 seconds.
2. This will cause the hoist to lower and cause the FST belts to hold boards from entering the stack until the lift is in place again.
3. Once the lift is at the bottom position then the conveyor will start.
4. When the board lift is clear the hoist will raise to the up position.

3.9.5 Clearing Jams

1. To stop the Stacker zone, if necessary, at any time press the “Zone Stop” button.
2. If board is jammed in the Stacker, then bring the zone to safe zero power state by following the plant lockout procedure.
3. Check that the compressed air is safe off.
4. Check that the electrical power is off and locked off.
5. Test that no equipment will operate.
6. This will display the green beacon to allow entry through the gate.
7. Enter the zone.
8. Move or remove the boards that are not in proper position as needed.
9. Exit the zone.
10. Follow starting zone steps.
11. Check that position of the hoist, fingers and pushers are in the proper positions.
12. If positions are not all correct, then all the board must be removed manually from the stacker and belts then push the “Finger Stacker Home” button. This will cause the equipment to return to empty start position.

ALWAYS LOCK OUT COMPRESSED AIR AND ELECTRICAL POWER BEFORE CLIMBING ON MACHINE.

3.10 Hand Operated Pallet Loading System

The function of the Hand Operated Pallet Loading System is to load pallets and feed them into the Finger Stacker when pallet stacking is required. Hand Operating Pallet Loading System includes Pallet Slat Conveyor 1, for pallet alignment and loading on the Conveyor 1, Pallet Slat Conveyor 2 for staging and feeding pallets to Stacker Scissor Table / Stacker Lift Chain Conveyor, Electrical Light Curtains and Safety Switches for hand operating pallet loading controls.

4 Troubleshooting

The following table lists general issues that can occur in the takeoff area. Please see the maintenance manuals for each specific piece of equipment for more comprehensive troubleshooting guides.

4.1 General

Problem	Possible Cause(s)	Possible Solutions
Erroneous board measurements at the Cascade	Belts are slipping Board Sensor Issues	• Tighten Belts • Check Sensors
Board is being Rejected	Equipment not ready or board characteristics do not match equipment set-up	• Check “Reject First Cause” screens
Motors or Cylinders do not react as expected	Mechanical / Electrical Failure	• Use devices Hand-Off-Auto selector switches and confirm that the problem does not lie in the PLC Program • Contact Maintenance Personnel
Process / Machine out of sequence	Mechanical / Electrical Failure	• Use devices Hand-Off-Auto selector switches and confirm that the problem does not lie in the PLC Program • Check sensors status shown on the HMI Overview screens
Board Stopping Position varies	Belt or Board Slipping	• Check Belts Tension • Adjust Stopping Position using the HMI Offsets

END OF DOCUMENT