FastenerSync™ Newsletter

Issue 1
March 2014

integrated with the Pallet Design System™

The FastenerSync™ Newsletter is intended to keep Users informed about FastenerSync and its integration with the Pallet Design System™ and the *Uniform Standard for Wood Pallets.*

Introducing… FastenerSync™

Software for suppliers of fasteners to the wood pallet industry integrated with the Pallet Design System™ and the *Uniform Standard for Wood Pallets*.

The **National Wooden Pallet and Container Association** (**NWPCA**) has developed new **software** called **FastenerSync™** that will enhance the **communication** of **fastener specifications** between fastener **suppliers** and **wood pallet** manufacturers.

FastenerSync™ can be used to create complete and professional **documentation** of all the **fastener specifications** <u>defined</u> in the *Uniform Standard for Wood Pallets* and <u>required</u> as input to the **Pallet Design System™** (**PDS**).

FastenerSync™ can also be used to create **fastener specification** data files directly readable by **PDS** – allowing **fastener suppliers** to easily provide **specifications** for their **fasteners** to customers that use **PDS**.

FastenerSync™ computes the characteristics required to compare to minimum **fastener** requirements in the *Uniform Standard for Wood Pallets*.

Finally, **FastenerSync™** can be used to perform calculations of **fastener withdrawal resistance** and **lateral resistance** in a **pallet** connection (e.g. **deckboards** fastened to **stringers** or **blocks**).

FastenerSync™ is available via an annual license to **fastener suppliers** to the **wood pallet** industry that are **Members** of **NWPCA**.

(**PDS Users** may wish to encourage their **fastener supplier** to obtain **FastenerSync™** and provide **fastener specifications** and data files for <u>all</u> **fasteners** they purchase.)

The **objective** of this *Newsletter* is to introduce **FastenerSync™** and enable **Users** to quickly and efficiently learn to use the software.
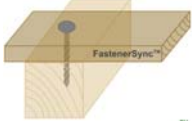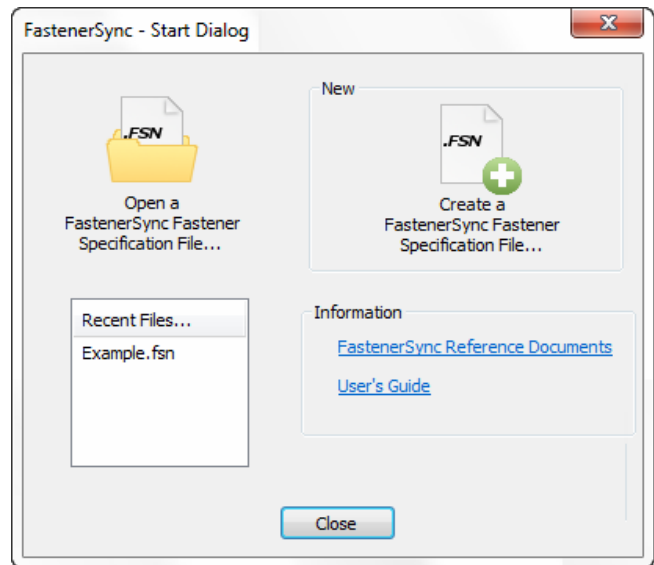
Getting Started...

When you start **FastenerSync**, the **Start Dialog** will appear.

This provides initial quick access to either Open an existing **FastenerSync** file or Create a new **FastenerSync Fastener Specification** File.
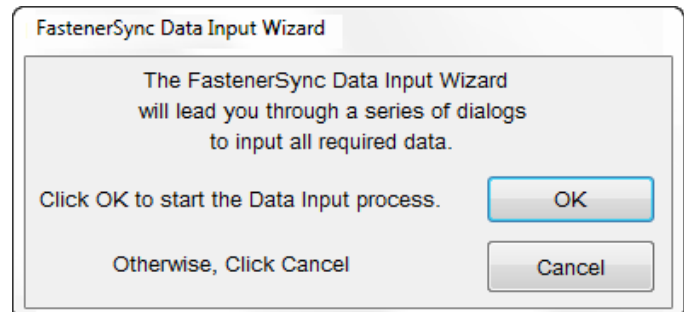
An **Example** file is provided.

The next sections of this *Newsletter* provide a walk-through of the complete process of Creating a **FastenerSync Fastener Specification** File.
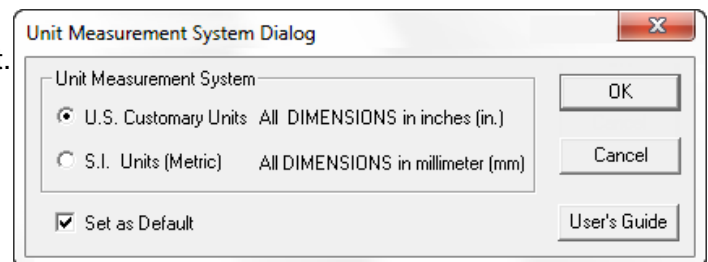
FastenerSync - Start Dialog

.FSN
Open a FastenerSync Fastener Specification File...

New

.FSN
Create a FastenerSync Fastener Specification File...

Recent Files...
Example.fsn

Information
FastenerSync Reference Documents
User's Guide

Close

Creating a FastenerSync Fastener Specification

After selecting to **Create** a **FastenerSync** File, the **FastenerSync Data Input Wizard** will lead the User through the entire process of specifying all the required data.

FastenerSync Data Input Wizard

The FastenerSync Data Input Wizard will lead you through a series of dialogs to input all required data.

Click OK to start the Data Input process.

Otherwise, Click Cancel

OK

Cancel

The **Unit Measurement System** Dialog will open first. **FastenerSync** can operate in either **S.I Units** (metric units) or **U.S. Customary Units**.

Unit Measurement System Dialog

Unit Measurement System
- U.S. Customary Units   All DIMENSIONS in inches (in.)
- S.I. Units (Metric)   All DIMENSIONS in millimeter (mm)

☑ Set as Default

OK

Cancel

User's Guide

For the **S.I Unit** Measurement System, all dimensions are in **millimeters** (mm), all loads are in **kilograms** (kg), and Yield Strength is in **MPa**.

For the **U.S. Customary Units** Measurement System, all dimensions are in **inches** (in.), all loads are in **pounds** (lbs.), and Yield Strength is in **ksi**.

(Later, you can **convert** a **fastener specification** from one measurement system to the other.)
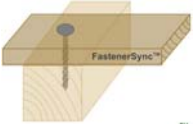
Creating a FastenerSync Fastener Specification (continued)

The **Fastener Specifications** Dialog opens next. After selection of **Fastener Type**, fields for all appropriate fastener measurements will be enabled.

Fastener ID will also be used as the default filename.

Fastener Types include:
Helically Threaded Nails
Annularly Threaded Nails
Twisted Square Wire Nails
Plain Shank Nails
Rectangular Wire Staples
Round Wire Staples

Thread Diameter
measurements are entered on a separate dialog.

Specification of the **steel** used to manufacture the fastener can be either **Carbon Content**, **Steel Grade**, or **Stock Steel -** and whether the fastener has been **Hardened**.

Specification of
**Point**, **Head**, **Feed Type**, and **Finish** is optional.

Bending Resistance
measurements are entered on a separate dialog.

Fastener Withdrawal Characteristic
is calculated for threaded nails.
It is a measure of the increased **withdrawal resistance** due to the threads compared to that for a plain shank nail of the same length and wire diameter.

The **FastenerSync User's Guide**
provides details on all fastener specifications, including tips on how to perform measurements.
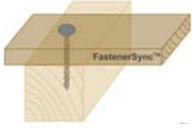
Thread Diameter Measurement Data

Thread Diameter measurements from a representative sample of the fasteners are entered on the **Thread Diameter Measurement Data** Dialog.

Measurement of a <u>minimum</u> sample of 12 fasteners is suggested. **FastenerSync** accommodates reporting **Thread Diameter** measurements for up to 25 samples.

Measuring <u>Thread</u> Diameter

The <u>average</u> **Thread Diameter** will be reported on the **Fastener Specification Dialog**.

<u>All</u> Thread Diameter measurement data will be reported on the **FastenerSync Specification Sheet**.

Thread Diameter Measurement Data

1.	0.120	13.	0.000
2.	0.121	14.	0.000
3.	0.121	15.	0.000
4.	0.120	16.	0.000
5.	0.122	17.	0.000
6.	0.120	18.	0.000
7.	0.119	19.	0.000
8.	0.120	20.	0.000
9.	0.121	21.	0.000
10.	0.121	22.	0.000
11.	0.119	23.	0.000
12.	0.120	24.	0.000
		25.	0.000

Statistics

Minimum	0.119
Maximum	0.122
Average	0.120
C.V. %	0.7

Compute

OK Cancel User's Guide Clear All

Bending Resistance Measurement

FastenerSync specifications must include a measure of the fastener's **Bending Resistance**. <u>Either</u> the **MIBANT Angle** <u>or</u> the **Bending Yield Strength** can be specified.

The **MIBANT Angle** is a measure of the **impact bending resistance** of the fastener. *Historically*, this convenient quality-control test has been used primarily for pallet fasteners.

Bending Yield Strength indicates the **bending resistance** of the fastener determined from **static-load** tests.

Bending Yield Strength is used as the basis of engineering calculations of the **lateral resistance** of **connections**. *Therefore*, if **MIBANT angle** is reported, **Bending Yield Strength** must be <u>estimated</u> (based on MIBANT Angle and wire diameter) in order to calculate **connection performance**.
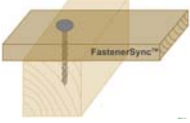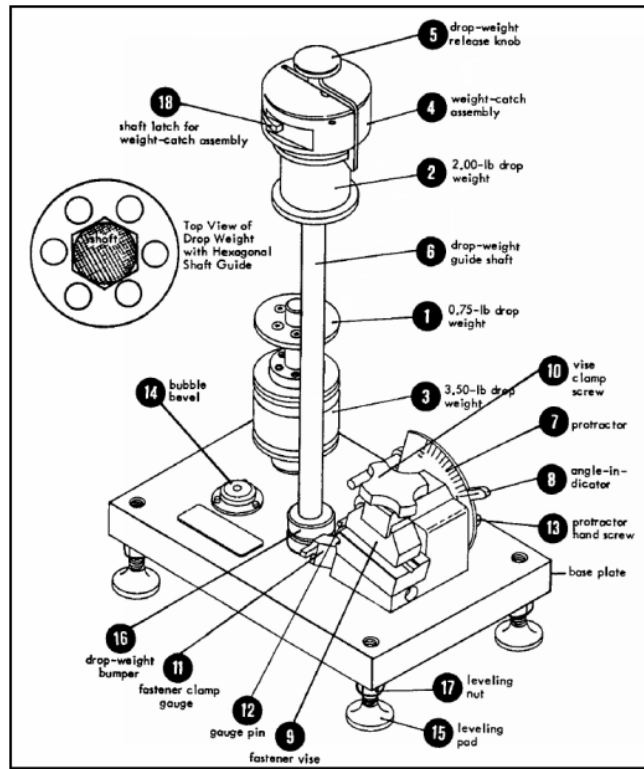
MIBANT Angle Measurement Data

The **MIBANT Angle** is a measure of the impact resistance of the fastener, and is related to its ductility, pliability, toughness, and brittleness.

MIBANT angle measurements from a representative sample of the fasteners are entered on the **MIBANT Angle Measurement Data** Dialog.

The **MIBANT Tester** utilizes 3 different **drop weights** to accommodate a range of **wire diameters** and **steel specifications.**

Measurement of a <u>minimum</u> sample of 12 fasteners is suggested. **FastenerSync** accommodates reporting **MIBANT Angle** measurements for up to 25 samples.

The **MIBANT Test** is useful in identifying any <u>brittleness</u> in fasteners, exhibited as shank or head-to-shank failures during test.
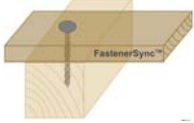
The <u>average</u> **MIBANT Angle** (adjusted to the **standard drop weight**) will be reported on the **Fastener Specification Dialog**.

<u>All</u> MIBANT Angle measurement data will be reported on the **FastenerSync Specification Sheet**.


Morgan Impact Bend Angle Nail Tester (MIBANT)

MIBANT Angle Measurement Data

MIBANT Drop Weight 3.50 lb. (Standard)

1.	36	13.	0	Partial Shank Failures	0
2.	37	14.	0	Complete Shank Failures	0
3.	36	15.	0	Head Failures	0
4.	37	16.	0		
5.	34	17.	0	Statistics	
6.	36	18.	0	Minimum	34
7.	35	19.	0	Maximum	37
8.	36	20.	0	Average	35
9.	37	21.	0	C.V. %	2.9
10.	34	22.	0		
11.	36	23.	0	Average Adjusted to Standard Drop Weight	35
12.	36	24.	0		
		25.	0		

Compute

OK

Cancel

User's Guide

Clear All

Bending Yield Strength Measurement Data

Bending Yield Strength is determined from the load-deformation curve during static-load bending tests conducted in accordance with **ASTM F 1575** (*Standard Test Method for Determining Bending Yield Moment of Nails.*)

ASTM F 1575 Bending Test For Nails

Load-Deformation Diagram from ASTM F 1575 Nail Bending Test
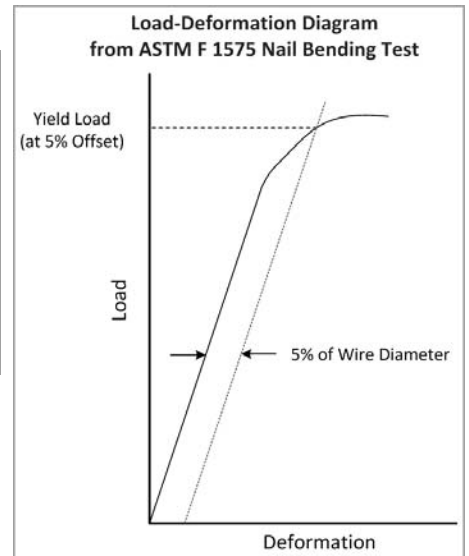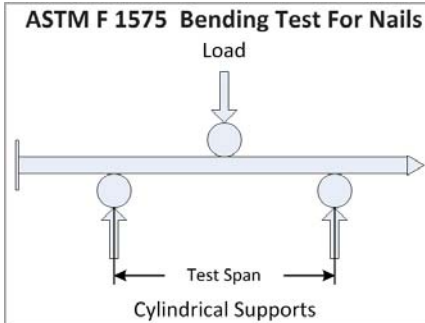
Test Load at 5% offset measurements from a representative sample of the fasteners are entered on the **Bending Yield Strength Measurement Data** Dialog.

Appropriate **Test Span** is based on wire diameter (see ASTM F 1575).

Testing a <u>minimum</u> sample of 12 fasteners is suggested. **FastenerSync** accommodates reporting **Test Load measurements** for up to 25 samples.

FastenerSync calculates **Bending Yield Strength** based on <u>Average</u> **Test Load**, fastener **Wire Diameter**, and **Test Span**.

Bending Yield Strength will be reported on the **Fastener Specification Dialog**.

<u>All</u> **Test Load** measurement data will be reported on the **FastenerSync Specification Sheet**.

Connection Performance Estimates

Based on the **fastener specification** and the **wood components** to be connected, **FastenerSync** can compute estimates of the:

- **Shank Withdrawal Resistance**
- **Head Pull-thru Resistance**
- **Lateral Load at Yield**

The **connection performance estimates** are based on a **single** fastener and are calculated using the equations detailed in Annex F of the *Uniform Standard for Wood Pallets*.

The <u>option</u> to compute connection performance estimates is selected on the **Connection Details** Dialog.

Wood Species Classes and **Moisture Contents** are those used in **PDS**.

On the **FastenerSync Specification Sheet**, **Withdrawal Resistance** is reported based on whichever is <u>limiting</u>: **Shank Withdrawal Resistance** <u>or</u> **Head Pull-thru Resistance**.
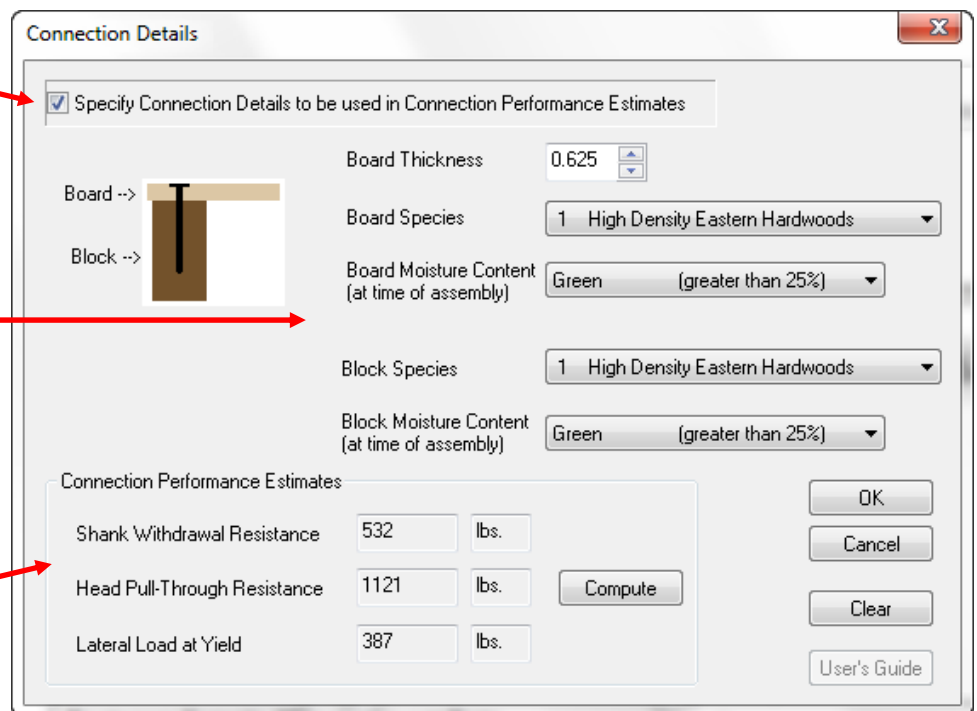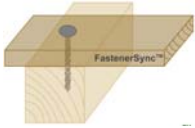

Fastener Image

If an **image** of the fastener is available, it can be displayed on the **Fastener Specification Sheet**.

Such an image could be produced from a digital photograph or by using a flat bed scanner.

To select an **image** to be displayed, open the image file on the **Fastener Image Dialog**.

Fastener Specification Sheet

The **FastenerSync Specification Sheet** provides complete details on the **Fastener** specification.

It can be **printed** or saved as a **PDF** and emailed to the **Customer.**

Company Name of the **fastener supplier** is identified under **Prepared by:** and via the **Watermark.**

Spec Sheet Notes can be used to display any additional notes or information.

FastenerSync Version 1.0

Customer:
Company Name of Customer
Address of Customer

Prepared by:
Fastener Supplier and NWPCA Member
Licensed to Use FastenerSync

FastenerSync License: 123   Printed: December 07, 2013

Fastener Specifications

Fastener ID:	Example
Fastener Type:	Helically Threaded Nail
Fastener Length:	2.25 in.
Thread Length:	1.50 in.
Thread Diameter:	0.122 in.
Wire Diameter:	0.112 in.
Head Diameter:	0.281 in.
Flutes:	4
Helixes:	6.0
Pitch:	0.250 in.
Thread Angle:	69 degrees
Bending Yield Strength:	119 ksi
FWC:	1.88

Stock Steel: Stiff stock

Point Type: Sharp Diamond Point
Head Type: Filleted
Feed Type: Bulk Machine
Finish Type: Bright

Fastener Sample Measurement Data

Thread Diameter (in.):

0.122	0.121	0.121	0.121	0.123
0.121	0.121	0.121	0.122	0.121
0.122	0.122	0.122	0.121	0.122
0.122	0.121	0.122	0.121	0.121
0.123	0.122	0.121	0.121	0.122

Minimum = 0.121 Maximum = 0.123 Average = 0.122 CV = 0.5%

Bending Yield Load at 5% Offset (lbs.):

100	105	104
101	100	105
102	101	
103	103	
104	100	

Minimum = 100 Maximum = 105 Average = 102 CV = 1.9%
Cylindrical bearing point spacing (test span) = 1.10 in.

Spec Sheet Notes:

This space can be used to include any Notes or Comments to be displayed on Fastener Specification Sheet.

Additional space for Notes or Comments here.

Connection Performance Estimates
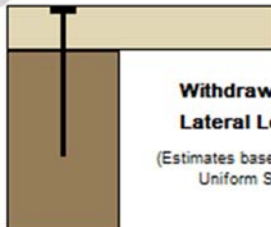
Board
Thickness: 0.625 in.
Species: High Density Eastern Hardwoods
MC (at assembly): Green
Block
Species: High Density Eastern Hardwoods
MC (at assembly): Green

Withdrawal Resistance: 532 lbs.
Lateral Load at Yield: 387 lbs.

(Estimates based on calculations documented in the Uniform Standard for Wood Pallets.)