Straight-Draw Threading Conversion  An earlier version of this article appeared in Complex Weavers Journal, No. 74, January 2004.

Views of the Problem

Suppose you have a straight-draw warp on \( n \) shafts (for example, 8) and want to use it to weave patterns designed for fewer shafts (say 4). The crucial point was that the pattern must come from a draft with an \( n \)-end repeat (say 8).

*Observation:* The pattern for any draft with a threading that has an \( n \)-end repeat can be woven with a straight-draw threading on \( n \) shafts.

For example, given an 8-shaft straight-draw threading (which has an 8-end repeat), patterns with drafts for 2 through 8 shafts (not just 4) can be woven, provided the drafts have 8-end threading repeats. (Actually, this applies to more than 8 shafts, although if a draft has more than 8 shafts and has an 8-end threading repeat, not all the shafts are used.) Notice that any 8-shaft draft with an 8-end threading repeat can be woven with a straight-draw threading; it’s just a matter of rearranging the rows in the tie-up.

The problem can be turned around. Instead of assuming a straight-draw threading on \( n \) shafts and looking for drafts with \( n \)-end threading repeats to convert, consider the problem of converting drafts to drafts with straight-draw threadings without knowing, \textit{a priori}, how many shafts would be required.

The two views are, of course, equivalent. It is just easier to formulate the problem by starting with a draft to convert.

Note that any draft can be converted to a draft with a straight-draw threading — the problem is that if the repeat is not small (or if there is no repeat), the number of shafts required may be impossibly large.

A Procedure

The first thing to do is to determine the repeat in the threading of the draft to be converted (the \textit{original draft}). This often can be done by inspection, but care is needed to make sure the smallest repeat is found. Short of inspection, increasingly longer initial parts of the threading can be tried to see if, when repeated, they match the whole threading.

Suppose the repeat has length \( n \). Then the new draft will have \( n \) shafts and a straight-draw threading. All that’s left is to get the tie-up for the new draft (the treadling is the same as for the old draft).

Getting the tie-up is easy. Just start at the beginning of the threading for the original draft and add the corresponding row of its tie-up to the new tie-up, continuing end-by-end through the repeat.
An Example

Here's a simple example: a 3-shaft draft with a threading repeat of length 6.

Original Draft

The new draft will, of course, have 6 shafts, so start with a blank 6-row tie-up.

Putting the original tie-up and the threading repeat next to each other helps in visualizing the process:

Original Tie-Up and Repeat

The new tie-up with the straight-draw repeat looks like this:

The Initial Setup

Start at the beginning of the repeat, looking at the first end. It is on shaft 1, so copy row 1 of the original tie-up to row 1 of the new tie-up:
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Step One

Now we go on to the second end of the repeat. It is on shaft 2, so copy the second row of the original tie-up to the next row of the new tie-up:

Step Two

The third end is on shaft 1, so copy the first row of the original tie-up to the next row of the new tie-up:

Step Three

End 4 is on shaft 2, so copy row 2 of the original tie-up to the next row of the new tie-up:

Step Four
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We’re getting there. For end 5, we copy row 3 of the original tie-up to the next row of the new-tie-up:

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new  original
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**Step Five**

To complete the process, we copy row 2 of the original tie-up to the top row of the new tie-up:

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new  original
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**Step Six**

Here’s what the new tie-up and threading repeat look like:

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**New Tie-Up**

The new draft looks like this:
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New Draft

The Appendix contains examples of the conversion of several other drafts.
Conversion Examples

original

new