

**Cargo Securement Equivalent Means of Securement
49 CFR 393.102(c)**

Effective Date: August 7, 2019

Dub Ross Company, Inc.
6300 Melrose Lane
Oklahoma City, OK 73127


W. Michael Ross
President, Dub Ross Co, Inc.

THIS DOCUMENT MUST BE CARRIED BY THE DRIVER OF THE SUBJECT COMMERCIAL MOTOR VEHICLE, AND PRESENTED UPON THE REQUEST OF ANY LEGALLY AUTHORIZED ENFORCEMENT OFFICIAL.

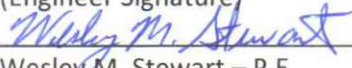
This document authorizes the utilization of the (cargo securement technique described) below in Interstate Commerce under the cargo securement conditions set forth in the attached engineering document. Failure to comply with the requirements of the specific cargo conditions as identified in the attached document may result in cargo securement violations of any inspected load.

Engineering Document

Effective Date: August 13, 2019

(Engineer Signature)

Engineering Firm: Holloway, Updike & Bellen, Inc.
P.O. Box 1543
Muskogee, Ok 74402


Wesley M. Stewart – P.E.
Holloway, Updike & Bellen, Inc.



Holloway, Updike & Bellen, Inc. hereby certifies the cargo securement technique under scenarios as described has been evaluated to meet cargo securement performance requirements as identified in:

- FMCSA 49 CFR 393.102 (a) – Tests conducted on the nested pipe securement device demonstrated performance under the following conditions, applied separately:
 - (i) 0.8 g deceleration in the forward direction
 - (ii) 0.5 g acceleration in the rearward direction
 - (iii) 0.5 g acceleration in the lateral direction
- FMCSA 49 CFR 393.102 (c) (1) – The load is immobilized, such that it cannot shift or tip to the extent that the vehicle’s stability or maneuverability is adversely affected.

(See reverse side for Conditions of Operation)

Conditions for Operation:

This document describes the securement technique used in the transporting of corrugated steel pipe and pipe arch.

- Applies to CSP diameters and arch equivalent from 6"- 144" diameters.
- "Nesting" CSP and pipe arch is when smaller diameter steel pipes are placed inside a pipe that is secured to the deck with load rated securement devices. The pipe that is secured to the trailer with load rated devices serves as an "Equivalent means of securement" as defined in CFR49 393.102(c)(1) as it pertains to lateral motion. The interior nested metal pipes are then restrained from forward and reverse movement by a double looped unmarked load securement device.
- This device has been designed and tested to restrain a 500lb pipe to meet the requirements of CFR49 393.102(a), meeting and exceeding a .8 g-force deceleration and .5g-force acceleration. Lateral acceleration is controlled by the trailer straps securing the outer pipe to the trailer. Pipes in excess of 500lbs, approximately the equivalent of a 36" diameter x 20' length, are secured by multiple devices utilizing one device per 500lbs of nested pipe weight.
- The trailer can be fully loaded or partially loaded.
- Prior to movement of the trailer, the interior, smaller diameter pipe is secured to the outer pipe by means of a double looped steel wire through punched holes in each pipe and joined using an industry standard steel or aluminum high tensile wire splice. The sleeve is then crushed using the number of crimps recommended by the crimping tool manufacturer for use with the selected sleeve. For the connection to be completed, the "wire tails" must be bent back toward the connector greater than 90 degrees. (see Figures 1 through 3).
- The device incorporates a 12.5 gauge steel wire which in single strand develops 200K ultimate tensile with a rated breaking strength of a minimum 1540 and 1417lbs each respectively for the mill product specifications from the included two suppliers. The joined device is a double strand, thereby doubling its strength. In this configuration the device will meet a safety factor in excess of 4 for the maximum WLL required for 500lbs of nested pipe which is in compliance with CFR49 393.102 and 104.



Figure 1: Picture of Specific Cargo Securement Technique (as applicable to this load)



Figure 2: Picture of Specific Cargo Securement Technique (as applicable to this load)

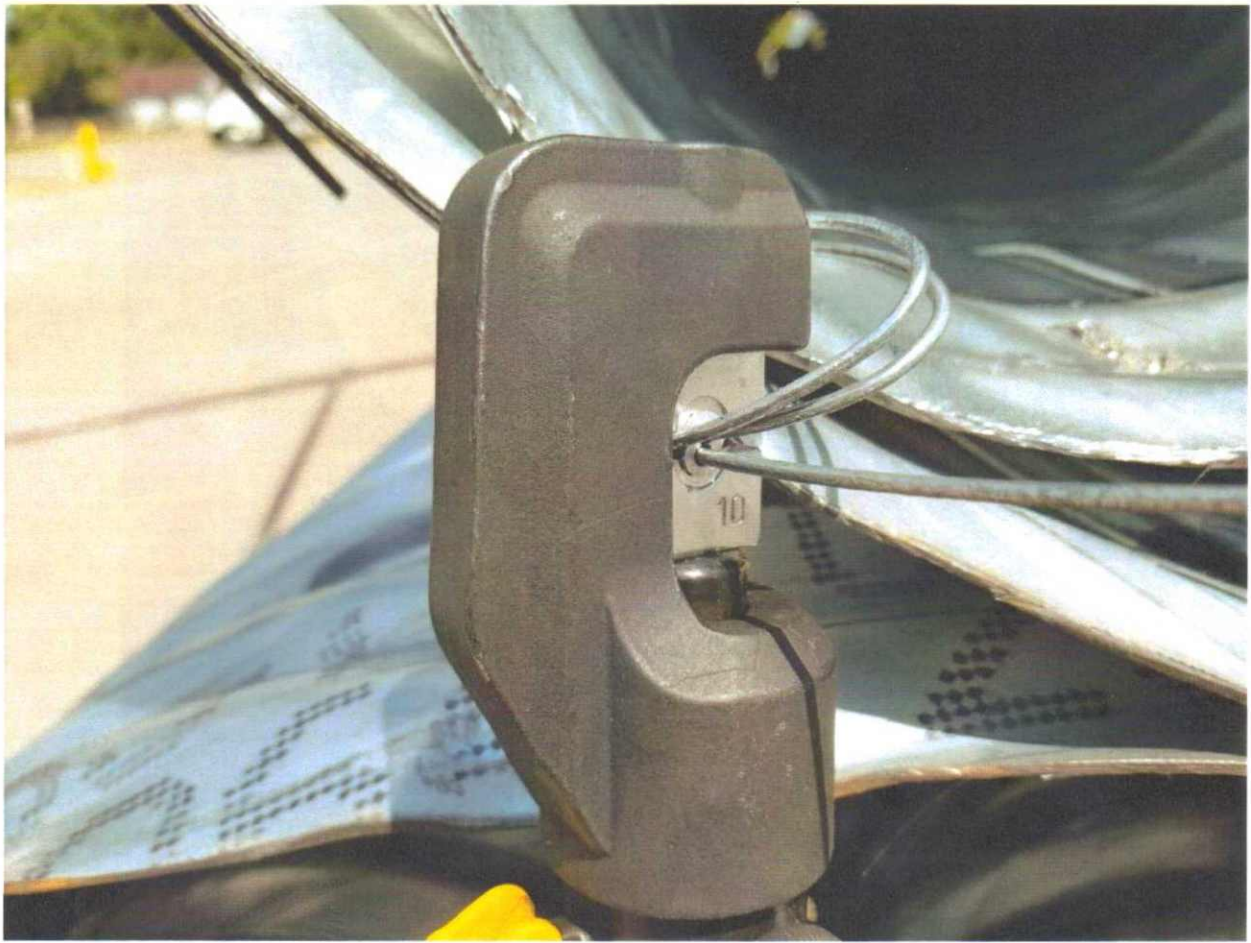


Figure 3: Picture of Specific Cargo Securement Technique (as applicable to this load)