



SUBJECT: nVent LENTON
TRADITIONAL/ULTIMATE
INSTALLATION INSPECTION GUIDE

IP8655 REV A
DATE: 5/MAY/2023
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PRODUCT: LENTON
TRADITIONAL and
ULTIMATE

REFERENCE: PDF057, PDF051, PDF097, IP8395, IP8396
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SCOPE

This document defines acceptable installation inspection criteria for the following:

1. nVent LENTON **Traditional** splicing and anchoring systems
2. nVent LENTON **Ultimate** splicing and anchoring systems
3. Hybrid configurations of nVent LENTON **Traditional** and **Ultimate** splicing and anchoring systems

Based on the information contained in this document and the references herein, the Engineer of Record shall determine project-specific inspection requirements and inspection frequency considering factors such as experience and competency of installers, number of splices/couplers, structural demands, etc.

DEFINITIONS

- "**Standard**" Splice – A standard splice is designed to join two lengths of rebar where at least one of the rebar lengths must be free to rotate about its axis and be moved in line with its axis.
- "**Position**" Splice – A position splice is designed to join two lengths of rebar in situations where one or both rebar lengths are UNABLE to rotate about their axis. The coupler device can be rotated to connect the two bars. The P9 and P14 position couplers require that at least one of the rebar lengths being spliced be free to move in line with its axis. The P8 and P13 position couplers can splice two lengths of rebar even in situations where neither is free to rotate about their axis nor be moved in line with their axis.
- "**Terminator**" – The nVent LENTON Terminator is a mechanical rebar anchor designed to attach to the end of one length of rebar – enabling anchorage of the rebar when embedded in concrete.
- nVent LENTON **Traditional** – Rebar splicing and anchoring system where male taper threads are cut with an nVent LENTON threader onto the end of the rebar(s) being spliced or anchored. The mating female threaded component (coupler or anchor) belongs to the following part number families:
 - o For 'standard' splices: A2, A12
 - o For 'position' splices: P8, P9, P13, P14
 - o For mechanical anchorage (Terminators): D6, D14, D16
- nVent LENTON **Ultimate** – Rebar splicing and anchoring system where the male or female threaded components or mechanical anchors are friction welded to the end of the rebar with an nVent LENTON Ultimate Friction welding machine. Ultimate components belong to the following part number families:
 - o For 'standard' splices: MT12, FT12
 - o For 'position' splices: MT12, PT15, MS15
 - o For mechanical anchorage: DR14, DR16, TDR14, TDR16
- **Hybrid** installation configuration – Rebar splicing and anchoring system where the assembled splice or head utilizes components from both **Traditional** and **Ultimate** systems.

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1) INSPECTION OF NVENT LENTON TRADITIONAL PRODUCT INSTALLATION:

a) TRADITIONAL SPLICES, STANDARD AND POSITION

i) STANDARD & STANDARD-TRANSITION COUPLERS (A2, A12) WITH TAPER-THREADED REBAR

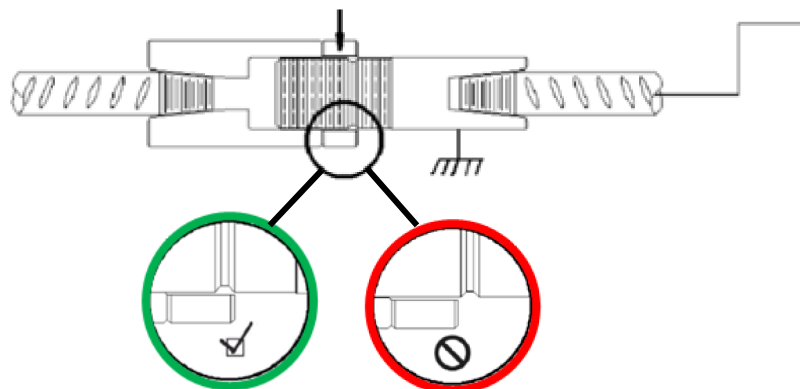


- (1) TIGHTNESS – Verify minimum torque of threaded connections to PDF057.
- (2) VISUAL – Rebar size shall match coupler size.

ii) TRADITIONAL POSITION AND POSITION-TRANSITION COUPLERS (P8, P9, P13, P14) WITH TAPER-THREADED REBAR



- (1) TIGHTNESS – Verify minimum torque of threaded connections to PDF051.
- (2) VISUAL:
 - (a) Rebar size shall match coupler size.
 - (b) With lock ring tightened against position coupler body, ensure that the inspection groove is covered by the lock ring per PDF051.





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b) TRADITIONAL ANCHORS

i) TERMINATOR (D6, D14, D16) with taper-threaded rebar



(1) TIGHTNESS – Verify minimum torque of threaded connection to PDF097.

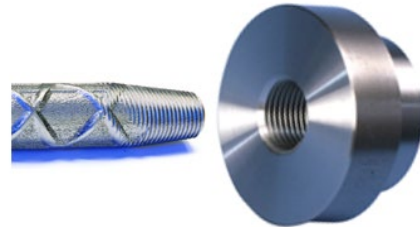
(2) VISUAL:

(a) Rebar size shall match Terminator size.

(b) After tightened per PDF097, it is acceptable for the face at the tip of the rebar taper thread to be as much as -2 threads recessed from the back face of the Terminator or extend +2 threads beyond the back face.

(c) Terminators of size/part configurations ELxD16 #14 and #18 and ELxD14 #9 - #18 have a step down diameter on the backside of the Terminator (nearest the rebar tip).

This reduced diameter allows installers the ability to tighten the Terminator with a common pipe wrench.^a



^a Changes in 2017 to ASTM A970 included mechanical anchor bearing area obstruction requirements – prompting the smaller diameter section of certain Terminator designs to be located nearest the tip of the rebar. Terminators made prior to ASTM A970-17 are oriented such that the smaller diameter is farthest from the threaded rebar tip.

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2) INSPECTION OF NVENT LENTON ULTIMATE PRODUCT INSTALLATION:

- a) ULTIMATE SPLICES, STANDARD AND POSITION
 - i) ULTIMATE STANDARD AND STANDARD-TRANSITION
(LUxxMT12/LUxxFT12)



- (1) TIGHTNESS – Verify that the taper threaded connection is at a minimum SNUG tightened per IP8396.
- (2) VISUAL:
 - (a) Rebar size to match LU component size for standard splices. For transition splices, the ASTM rebar size may be one rebar size smaller than the friction welded LUxxMT12 or LUxxFT12 component size.
 - (b) Up to one full turn of the male taper thread may be visible at the mouth of the LUxxFT12 component (Figure 1). – **assuming that** the thread is fully snug tightened following IP8396.



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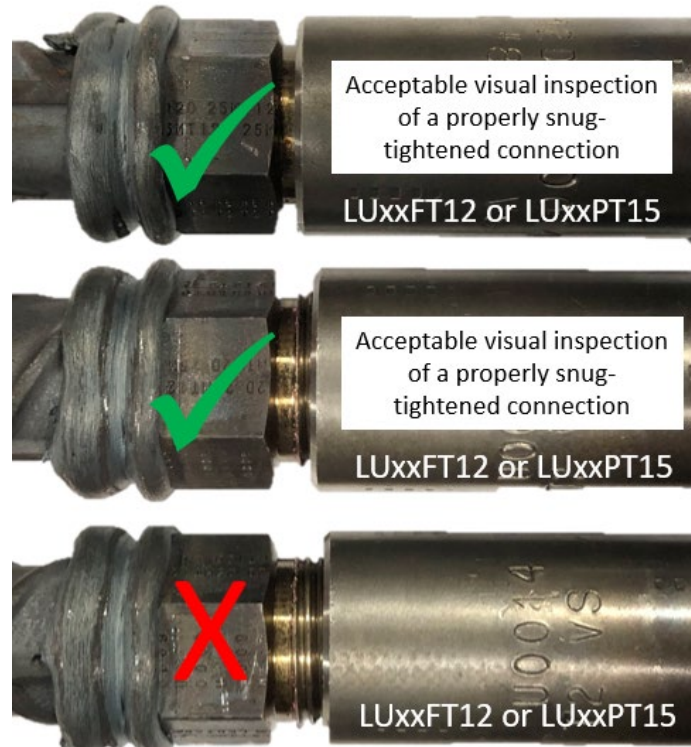


Figure 1, TOP & MIDDLE: Visual inspection is accepted (IF INSTALLED PER IP8396/IP8695) as less than one full turn of the male taper thread is visible at the mouth of the female taper-threaded component (LUxxFT12 or LUxxPT15). BOTTOM: Visual inspection is rejected as more than one full turn of the male taper thread is visible at the mouth of the female taper-threaded component.



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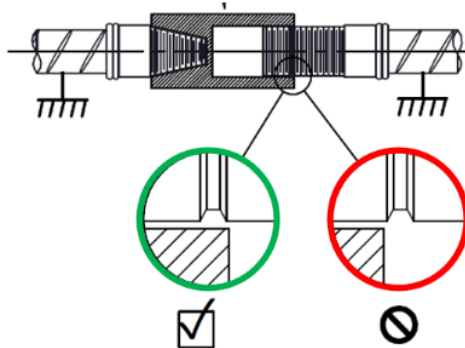
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ii) ULTIMATE POSITION AND POSITION-TRANSITION
(LUxxMT12/LUxxPT15/LUxxMS15)



- (1) TIGHTNESS – Verify that the taper threaded connection is at a minimum SNUG tightened per IP8395.
- (2) VISUAL:
 - (a) Rebar size to match size on LU component for standard splices. For transition splices, the ASTM rebar size may be one rebar size smaller than the friction welded LUxxMT12 or LUxxMS15 component size.
 - (b) With LUxxMS15 parallel thread in its final position relative to the LUxxPT15 coupler, ensure the inspection groove is covered per IP8395.



- (c) Up to one full turn of the male taper thread may be visible at the mouth of the female taper-threaded LUxxPT15 component (reference Figure 1) – **assuming that** the thread is fully snug tightened per IP8395.



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b) ULTIMATE ANCHORS

i) **LUxxDR14, LUxxDR16 & LUxxTDR14, LUxxTDR16**



- (1) TIGHTNESS – Ultimate Anchors are permanently affixed to the rebar with a friction welding process – there is NO INSPECTION requirement for tightness.
- (2) VISUAL – As Ultimate Anchors are friction welded and visually inspected in the rebar fabrication facility, no visual inspection is required once placed in the structure.



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3) INSPECTION OF HYBRID CONFIGURATIONS OF TRADITIONAL AND ULTIMATE PRODUCT INSTALLATION

a) HYBRID SPLICES, STANDARD AND POSITION

i) HYBRID STANDARD

(1) TRADITIONAL TAPER- THREADED REBAR TO **LUxxFT12**



- (a) TIGHTNESS – Verify minimum torque of taper-threaded connection to PDF057.
- (b) VISUAL – Rebar size shall match coupler size.

(2) **LUxxMT12** TO TRADITIONAL & TRADITIONAL-TRANSITION COUPLERS (**A2, A12**)



- (a) TIGHTNESS – Verify that the taper-threaded connection is at a minimum SNUG tightened per IP8396.
- (b) VISUAL:
 - (i) LUxxMT12 size shall match coupler size.
 - (ii) When the LUxxMT12 is snug tightened with an A2 coupler per IP8396, multiple turns of the LUxxMT12 thread will be visible at the mouth opening of the A2 coupler (top image in Figure 2).
 - (iii) When the LUxxMT12 is snug tightened w/ an A12 coupler per IP8396, up to one full turn of the LUxxMT12 thread may be visible at the mouth opening of the A12 (bottom image in Figure 2).



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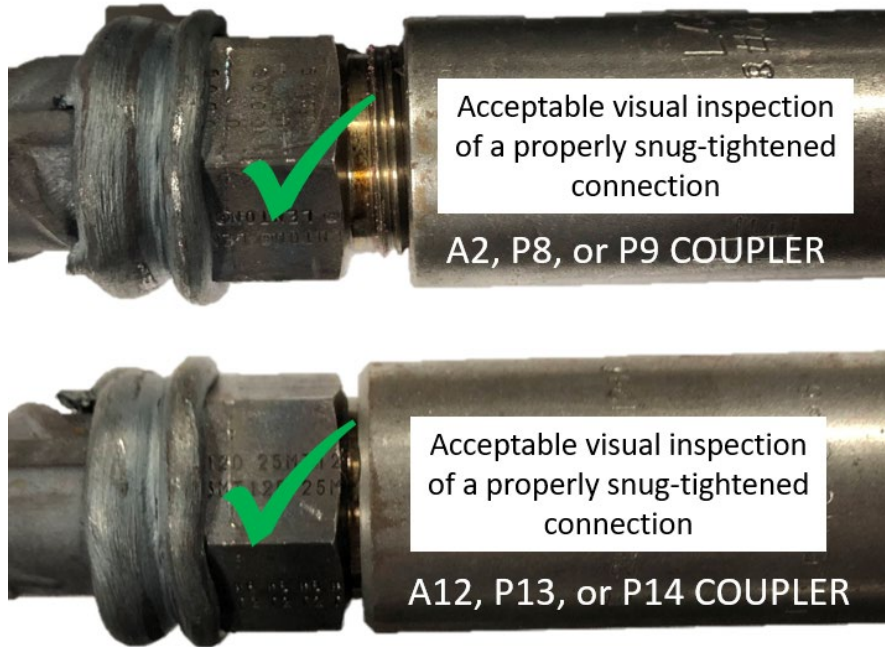


Figure 2, TOP: Acceptable visual inspection of LUxxMT12 installed to the A2, P8, or P9 female taper thread. BOTTOM: Acceptable visual inspection of the A12, P13, or P14 female taper thread.



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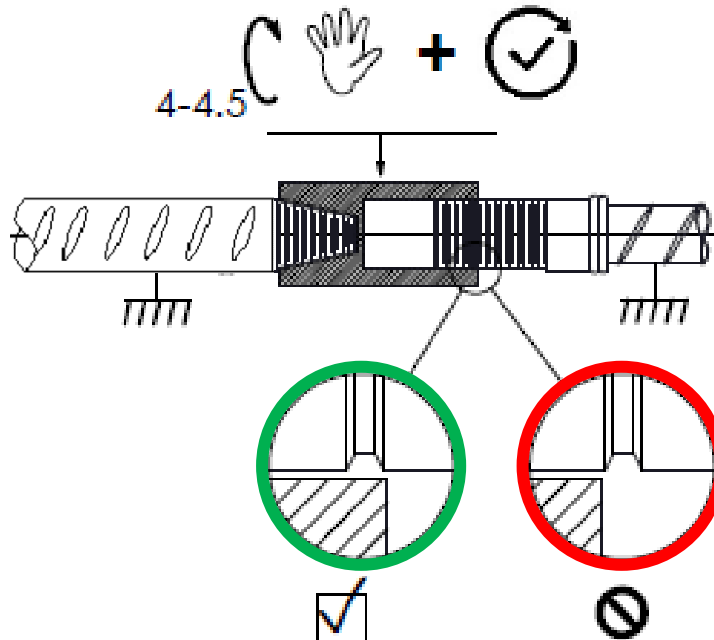
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ii) HYBRID POSITION

(1) TRADITIONAL TAPER-THREADED REBAR TO LUxxPT15



- (a) TIGHTNESS – Verify minimum torque to PDF057 or PDF051.
- (b) VISUAL:
 - (i) Rebar size shall match coupler size.
 - (ii) With coupler in final position, ensure that the inspection groove is covered by the LUxxMS15 coupler per IP8395.





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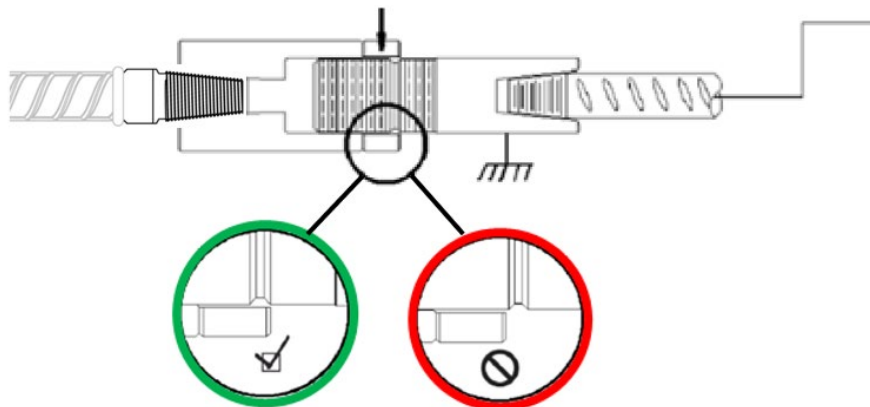
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(2) LUxxMT12 TO TRADITIONAL POSITION AND POSITION-TRANSITION COUPLERS (P8, P9, P13, P14)



- (a) TIGHTNESS – Verify that the taper-threaded connection is at a minimum SNUG tightened per IP8395.
- (b) VISUAL:
 - (i) LUxxMT12 size shall match coupler size.
 - (ii) When the LUxxMT12 is snug tightened with a P8 or P9 per IP8395, multiple turns of the LUxxMT12 thread will be visible at the mouth opening of the P8 or P9 coupler (top image in Figure 2).
 - (iii) When the LUxxMT12 is snug tightened with a P13 or P14 per IP8395, up to one full turn of the LUxxMT12 male taper thread may be visible at the mouth opening of the P13 or P14 coupler (bottom image in Figure 2).
 - (iv) With lock ring tightened against position coupler body, ensure that the inspection groove is covered by the lock ring per PDF051.





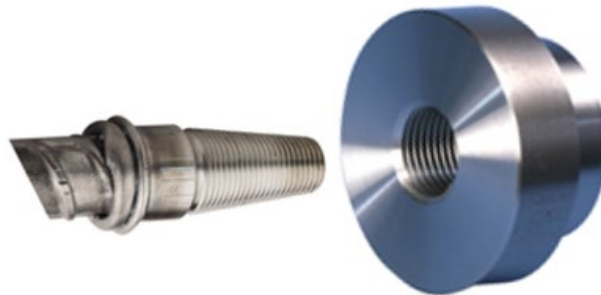
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b) HYBRID ANCHORS

i) **LUxxMT12 TO TERMINATOR (D6, D14, D16)**



- (1) TIGHTNESS – Verify that the taper-threaded connection is at a minimum SNUG tightened per IP8396.
- (2) VISUAL:
 - (a) LUxxMT12 size shall match and Terminator size.
 - (b) When the LUxxMT12 is snug tightened per IP8396 into the female taper thread of the D6 Terminator, multiple turns of the LUxxMT12 male taper thread will be visible at the mouth opening of the D6 Terminator (top image in Figure 3).
 - (c) When the LUxxMT12 is snug tightened per IP8396 into the female taper thread of the D14 or D16 Terminator, up to one full turn of the male taper thread of the LUxxMT12 may be visible at the mouth opening of the D14 or D16 Terminator (bottom image in Figure 3).



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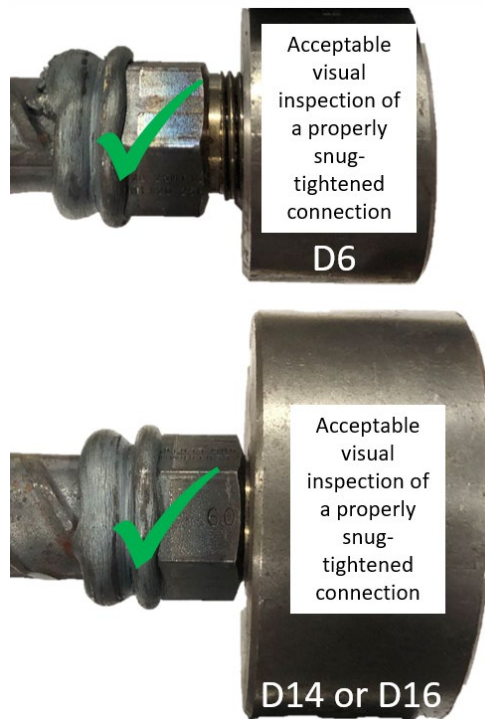


Figure 3, TOP: Acceptable visual inspection of the LUxxMT12 fastened to the D6 Terminator. BOTTOM: Acceptable visual inspection of the LUxxMT12 fastened to a D14 or D16 Terminator.



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4) PERFORMANCE OF EACH INSTALLATION CONFIGURATION

nVent LENTON rebar splicing and anchoring systems are designed to meet specific performance criteria as defined by relevant governing codes. The 'General Rules' and Table below identify each splice/anchoring configuration described in this document and list the relevant performance criteria compliance.

1. General Rule 1: If a male taper thread from the rebar splice or rebar mechanical anchor is cut from virgin rebar (ASTM A706/615 Gr 60 or 80), then the minimum designed performance is ACI 318 Types 1 & 2 for the rebar splice, or ASTM A970 Class A for the rebar anchor.
2. General Rule 2: If all male taper threads used in the rebar splice or rebar mechanical anchor are from the LUxxMT12D family, the splice or mechanical anchor is designed to meet the actual ultimate strength of the rebar being spliced or headed (ASTM A706/615 Gr 60 or 80).

	CONFIGURATION	PERFORMANCE COMPLIANCE
TRADITIONAL	TRADITIONAL STANDARD & STANDARD-TRANSITION COUPLERS (A2, A12) WITH TAPER-THREADED REBAR	Type 1 and Type 2 per ACI 318-18
	TRADITIONAL POSITION AND POSITION-TRANSITION (P8, P9, P13, P14) WITH TAPER-THREADED REBAR	
	TERMINATOR (D6, D14, D16) with taper-threaded rebar	Class A per ASTM A970-18
ULTIMATE	STANDARD (LUxxMT12/LUxxFT12)	Type 1 and Type 2 per ACI 318-18 & Service and <i>Ultimate</i> ^b per Caltrans
	POSITION (LUxxMT12/LUxxPT15/LUxxMS15)	
	LUxxDR14, LUxxDR16 & LUxxTDR14, LUxxTDR16	Class A and Class B per ASTM A970-18
HYBRID	LUxxMT12 TO TRADITIONAL & TRADITIONAL-TRANSITION COUPLERS (A2, A12)	Type 1 and Type 2 per ACI 318-18 & Service and <i>Ultimate</i> ^b per Caltrans
	TRADITIONAL TAPER-THREADED REBAR TO LUxxPT15	Type 1 and Type 2 per ACI 318-18
	LUxxMT12 TO POSITION & POSITION-TRANSITION COUPLERS (P8, P9, P13, P14)	Type 1 and Type 2 per ACI 318-18 & Service and <i>Ultimate</i> ^b per Caltrans
	LUxxMT12 TO TERMINATOR (D6, D14, D16)	Class A and Class B per ASTM A970-18

^b Caltrans defines the Service and *Ultimate* splice performance requirements in the document **CALIFORNIA DEPARTMENT OF TRANSPORTATION AUTHORIZATION PROCEDURES AND ACCEPTANCE CRITERIA FOR MECHANICAL COUPLERS ON ASTM A706 and ASTM A615 REINFORCING STEEL**. nVent LENTON Ultimate is the a product line designed to develop the 'ultimate' strength of the rebar and meet Caltrans *Ultimate* splice performance criteria when tested to CT670 (Caltrans).

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