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# Element Data Errors and Checks

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Updated January 2020.

Element data must be submitted for all bridges on the National Highway System (NHS), including border bridges, regardless of ownership and maintenance or inspection responsibility. Data must be submitted in accordance with the Specification for the National Bridge Inventory Bridge Elements ([SNBIBE](#)).

All files should be checked for errors prior to submittal using the online [NBI Element File Check](#) or the Element Data Checker within the National Bridge Inventory (NBI) application. The errors and checks outlined below will appear on the resulting processing report, except fatal errors which prevent processing. Tabs that do not contain data will not be produced. Element records that do not have a matching Structure Number in the NBI will be flagged for the bridge owner's attention, and will not be processed.

All data tags should contain values. An empty data tag is ignored by the system.

## *Types of Errors/Checks*

*There are 3 types of errors and one type of check, as defined below.*

### **FATAL ERRORS**

Fatal errors prevent processing of the file. A file containing fatal errors will be returned for correction and resubmittal. Fatal errors occur if the [STATE] State Code does not match the State selected for submittal.

### **CRITICAL ERRORS**

Critical errors prevent individual bridge records from being processed, and therefore prevent acceptance of the file. A file containing critical errors will be returned for correction and resubmittal. Critical errors occur if the [STATE] State Code or [STRUCNUM] Structure Number is missing or invalid, or if no valid [EN] Element Number(s) are submitted for a bridge. These errors appear on the Critical tab. Critical errors also occur if a bridge is coded in the NBI as being on the NHS, but no element data are submitted for that bridge. These bridges are listed on the NHS tab.

### **ERRORS**

Errors appear on the Error Summary and Error Detail tabs. These are true errors that are not considered critical but are nonetheless important and must be corrected prior to the next submittal. All errors that are non-fatal and non-critical fall into this category.

### **CHECKS**

Checks appear on the Check Summary and Check Detail tabs. Checks are intended to inform the bridge owner of a possible error in the data. Bridge owners are expected to review the checks to determine whether there is an error or simply an unusual situation that cannot be fully accommodated by the data. Errors must be corrected prior to the next submittal.

## Required Fields

The following fields are required for each element record and must contain valid values, as defined in the following section. If a valid value is not submitted for each field, an error will occur. The type of error (as defined above) is indicated below.

Field Name	Item Name	Error Type	Criteria
[STATE]	State	FATAL ERROR	does not match state selected for submittal
		CRITICAL ERROR	if missing or invalid
[STRUCNUM]	Structure Number	CRITICAL ERROR	if missing or invalid
[EN]	Element Number	CRITICAL ERROR	if no valid elements submitted for a bridge
		ERROR	if missing or invalid
[EPN]	Element Parent Number	ERROR	if missing or invalid when Element 510, 515, or 521 is submitted
[TOTALQTY]	Element Total Quantity	ERROR	if missing or invalid
[CS1]	Element Quantity Condition State One	ERROR	if missing or invalid
[CS2]	Element Quantity Condition State Two	ERROR	if missing or invalid
[CS3]	Element Quantity Condition State Three	ERROR	if missing or invalid
[CS4]	Element Quantity Condition State Four	ERROR	if missing or invalid

## Valid Value Definitions

Errors for the following valid value determinations will occur as defined in the previous section. Values that do not conform to the format defined in the SNBIBE are considered invalid and will not be processed.

- [STATE] valid values are defined in [ANSI/FIPS](#). Leading zeroes may be included or omitted for State codes 01 to 09. An invalid [STATE] value will result in removal of the entire element record from processing.
- [STRUCNUM] valid values are 15 characters or fewer. An invalid [STRUCNUM] value will result in removal of the entire element record from processing. [STRUCTNUM] valid values not found in the NBI will be listed on the Not Found tab, and those records will not be processed. Because the element data file is compared to the existing NBI data, new bridges may appear on the Not Found tab during the file check. This will not occur during processing if those records are present in the submitted NBI file, as that file will be processed before the element data file.

3. [EN] valid values are prescribed in the SNBIBE. Below is the list of valid [EN] values. An invalid [EN] value will result in removal of the entire element record from processing.

12	29	60	106	112	118	142	147	155	202	207	213	219	228	235	243	302	310	315	333
13	30	65	107	113	120	143	148	156	203	208	215	220	229	236	244	303	311	316	334
15	31	102	109	115	135	144	149	157	204	210	216	225	231	240	245	304	312	330	510
16	38	104	110	116	136	145	152	161	205	211	217	226	233	241	300	305	313	331	515
28	54	105	111	117	141	146	154	162	206	212	218	227	234	242	301	306	314	332	521

Note that FHWA does not collect elements 320, 321, or 520.

4. [EPN] valid values are defined in the following tables. All [EPN] values must be valid [EN] values. Certain [EPN] values will result in checks because, although unusual, it is possible that they are valid.

**Valid [EPN] Values for EN 510 (Wearing Surfaces)**

Error Type	Element Categories	EPNs
No Error (Valid EPN)	Deck/Slab	12, 13, 15, 16, 28, 29, 30, 31, 38, 54, 60, or 65
Check	Culvert	240, 241, 242, 243, 244, or 245
Error (Invalid EPN)	Any Other Element	Any other EPN

**Valid [EPN] Values for EN 515 (Steel Protective Coating)**

Error Type	Element Categories	EPNs
No Error (Valid EPN)	Steel Element or Bearing or Joint	28, 29, 30, 102, 107, 113, 120, 141, 147, 148, 152, 161, 162, 202, 207, 219, 225, 231, 240, 300, 301, 302, 303, 304, 305, 306, 310, 311, 312, 313, 314, 315, 316, or 330
Check	Any Other Element	Any other EPN

**Valid [EPN] Values for EN 521 (Concrete Protective Coating)**

Error Type	Element Categories	EPNs
No Error (Valid EPN)	Concrete Element	12, 13, 15, 16, 29, 38, 104, 105, 109, 110, 115, 116, 143, 144, 154, 155, 204, 205, 210, 215, 220, 226, 227, 233, 234, 241, 245, or 331
Check	Any Other Element	Any other EPN

5. [TOTALQTY] valid values are whole numbers greater than 0. This field is numeric. Zero, negative, and non-numeric values will be removed from processing. Decimal values will be rounded.
6. [CS1], [CS2], [CS3], and [CS4] valid values are whole numbers equal to 0 or greater. These fields are numeric. Negative and non-numeric values will be removed from processing. Decimal values will be rounded.

## Additional Errors

The following errors will appear on the Error Summary and Error Detail tabs.

1. Sum of [CS1], [CS2], [CS3], and [CS4] must equal [TOTALQTY].
2. Each [EN] value may be submitted only once per bridge, except EN 510, 515, and 521.
3. If EN 510, 515, or 521 is submitted for a bridge, there must be an [EPN] value.
4. Each instance of EN 510, 515, or 521 for a bridge must have a different [EPN] value.
5. Any [EPN] value submitted must also appear as an [EN] record for that bridge (example shown below for EN 12).

State Code	Structure Number	EN	EPN	Total Quantity	CS1	CS2	CS3	CS4
1	14277	12		16217	0	16000	217	0
1	14277	510	12	15783	15083	500	0	200

## Cross Checks

The following cross checks will appear on the Check Summary and Check Detail tabs.

1. For each bridge, if a Deck/Slab (EN less than 100) or Superstructure (EN in 100 series) element is submitted, then a Substructure (EN in 200 series) element should generally also be submitted.
2. For each bridge, if a Deck element is submitted (EN 12, 13, 15, 16, 28, 29, 30, 31, or 60), then a Superstructure (EN in 100 series) element should generally also be submitted.
3. For each bridge, if a Slab element (EN 38, 54, or 65) is submitted, then no Superstructure (EN in 100 series) element should generally be submitted.
4. For each bridge, if a Culvert element (EN 240, 241, 242, 243, 244, or 245) is submitted, then no Deck/Slab (EN less than 100), or Superstructure (EN in 100 series) elements should generally be submitted. Also, no Substructure elements (EN in remainder of 200 series) should generally be submitted except for foundation elements (Pile Cap/Footing or Pile – EN 220, 225, 226, 227, 228, or 229).

# Element Data Errors and Checks

Updated December 2019

## FATAL ERRORS (prevent processing)

Error #	Error Description	Notes
F003	STATE - XML input file does not match the State selected.	First record stops processing. Subsequent records give critical error.

## CRITICAL ERRORS (prevent acceptance)

Error #	Error Description	Notes
F001	STATE - Value is missing.	No tag submitted or empty tag submitted. Cannot be processed. Element record is removed from processing.
F003	STATE - XML input file does not match the State selected.	First record stops processing. Subsequent records give critical error.
F004	STATE - Invalid Value.	Must use 2-digit FIPS codes. Leading zero may be omitted. Invalid value cannot be processed. Element record is removed from processing.
F005	STRUCNUM - Value is missing.	No tag submitted or empty tag submitted. Cannot be processed. Element record is removed from processing.
F006	STRUCNUM - Length is longer than 15 characters.	Cannot be processed. Element record is removed from processing.
	No element data submitted for a bridge on the NHS.	Listed on a separate NHS tab. NBI Item 104 = 1 for bridges on the NHS.
F007	EN - No valid values submitted.	At least one valid EN is required for each bridge. CRITICAL if no valid elements are submitted. If one valid element is submitted and others are invalid, the errors are not considered critical but should still be addressed.

## ERRORS

Error #	Error Description	Notes
EN1	EN - Length is longer than 4 digits.	Cannot be processed. Element record is removed from processing.
EN2	EN - Invalid value.	Valid values listed in Word document and SNBIBE. Invalid values cannot be processed. Element record is removed from processing.
EN3	EN - Duplicate EN submitted for bridge.	Duplicate record is removed; only first EN record is retained. Only 510, 515, and 521 may be used more than once.
EN4	EN - Value is missing.	No tag submitted or empty tag submitted. Cannot be processed. Element record is removed from processing.
EPN1	EPN - Length is longer than 4 digits.	Cannot be processed. Value is removed.
EPN2	EPN - EN record missing for EPN submitted.	Any EPN submitted must also appear as an EN record.
EPN3-1	EPN - Missing EPN for EN 510	No EPN tag submitted or empty EPN tag submitted.
EPN3-2	EPN - Missing EPN for EN 515	No EPN tag submitted or empty EPN tag submitted.
EPN3-3	EPN - Missing EPN for EN 521	No EPN tag submitted or empty EPN tag submitted.
EPN5-1	EPN - Duplicate EPN submitted for EN 510.	Duplicate record is removed; only first EPN record is retained. EN 510 must have a different EPN for each instance.
EPN5-2	EPN - Duplicate EPN submitted for EN 515.	Duplicate record is removed; only first EPN record is retained. EN 515 must have a different EPN for each instance.
EPN5-3	EPN - Duplicate EPN submitted for EN 521.	Duplicate record is removed; only first EPN record is retained. EN 521 must have a different EPN for each instance.
EPN6	EPN - Invalid EPN for EN 510.	EPN is not a Deck/Slab or Culvert element.
C1	TOTALQTY - Sum of CS1 through CS4 does not equal TOTALQTY.	Value is retained but should be checked.
VQ0-1	TOTALQTY - Value is not a whole number.	Value is rounded.
VQ0-2	TOTALQTY - Value is not greater than 0.	Value is removed.
VQ0-3	TOTALQTY - Length is longer than 8 digits.	Cannot be processed. Value is removed.
VQ0-4	TOTALQTY - Value is missing.	No tag submitted or empty tag submitted.
VQ0-5	TOTALQTY - Value is not numeric.	Cannot be processed. Value is removed.
VQ1-1	CS1 - Value is not a whole number.	Value is rounded.
VQ1-2	CS1 - Value is not 0 or greater.	Value is removed.
VQ1-3	CS1 - Length is longer than 8 digits.	Cannot be processed. Value is removed.
VQ1-4	CS1 - Value is missing.	No tag submitted or empty tag submitted.
VQ1-5	CS1 - Value is not numeric.	Cannot be processed. Value is removed.
VQ2-1	CS2 - Value is not a whole number.	Value is rounded.
VQ2-2	CS2 - Value is not 0 or greater.	Value is removed.
VQ2-3	CS2 - Length is longer than 8 digits.	Cannot be processed. Value is removed.
VQ2-4	CS2 - Value is missing.	No tag submitted or empty tag submitted.
VQ2-5	CS2 - Value is not numeric.	Cannot be processed. Value is removed.
VQ3-1	CS3 - Value is not a whole number.	Value is rounded.
VQ3-2	CS3 - Value is not 0 or greater.	Value is removed.
VQ3-3	CS3 - Length is longer than 8 digits.	Cannot be processed. Value is removed.
VQ3-4	CS3 - Value is missing.	No tag submitted or empty tag submitted.
VQ3-5	CS3 - Value is not numeric.	Cannot be processed. Value is removed.
VQ4-1	CS4 - Value is not a whole number.	Value is rounded.
VQ4-2	CS4 - Value is not 0 or greater.	Value is removed.
VQ4-3	CS4 - Length is longer than 8 digits.	Cannot be processed. Value is removed.
VQ4-4	CS4 - Value is missing.	No tag submitted or empty tag submitted.
VQ4-5	CS4 - Value is not numeric.	Cannot be processed. Value is removed.

## CHECKS

Error #	Error Description	Notes
EN5	Missing substructure element.	If a Deck/Slab or Superstructure element is submitted, then a Substructure element should also be submitted. (Criteria changed.)
EN6	Missing superstructure element.	If a Deck element is submitted, then a Superstructure element should generally also be submitted.
EN7	Superstructure element submitted with slab element.	If a Slab element is submitted, then no Superstructure element should generally be submitted.
EN8	Deck element submitted for culvert.	If a Culvert element is submitted, then no Deck/Slab elements should generally be submitted.
EN9	Superstructure element submitted for culvert.	If a Culvert element is submitted, then no Superstructure elements should generally be submitted.
EN10	Substructure element submitted for culvert.	If a Culvert element is submitted, then no Substructure elements should generally be submitted except foundation elements.
EPN4-1	EPN - Invalid EPN for EN 510.	EPN is a Culvert element.
EPN4-2	EPN - Invalid EPN for EN 515.	EPN is not a Steel element, a Bearing, or a Joint.
EPN4-3	EPN - Invalid EPN for EN 521.	EPN is not a Concrete element.