10th S-101 Electronic Navigational Chart Project Team

S-101PT10

Use of Roles in the
Feature Catalogue

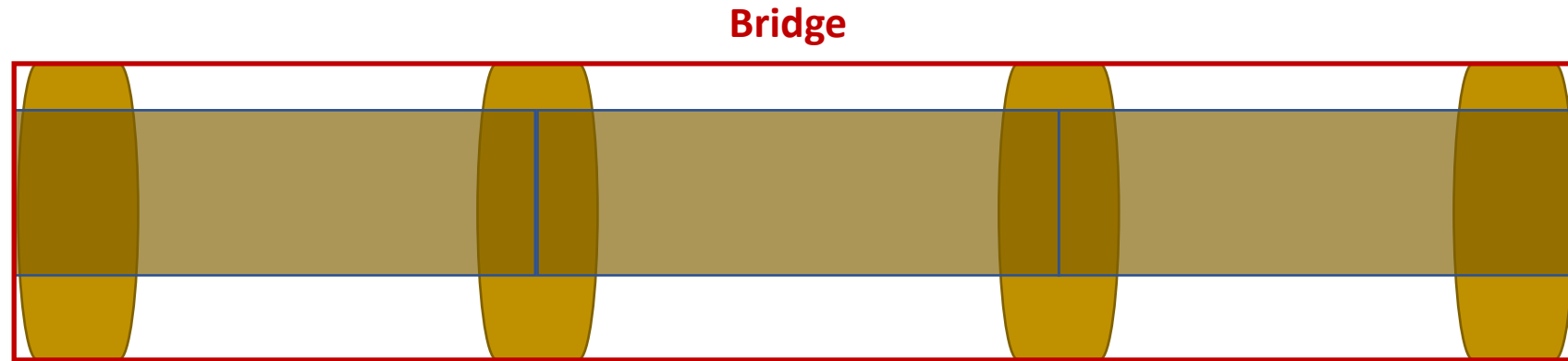**Agenda Item S-101PT10-07.7**

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Background: Associations in S-101

- Information associations
  - relationship between one instance of a feature type and one instance of an information type.
- Feature associations
  - relationship between one instance of a feature type and one instance of another feature type.
- Each of the related entities has a specific role (function)
- Roles have a direction of impact
  - **A** consists of **B**,C,D,E,…   **B** is component of **A**

Information Association,
Example: *Additional Information*

Bridge

Additional Information and roles:

- *ContactDetails* <u>information is provided</u> for **Bridge**
- **ContactDetails** <u>provides information</u> for *Bridge*

Contact Details

- communication channel
- call sign
- instructions
- etc.

Information Associations in the Feature Catalogue

```
-<S100FC:S100_FC_FeatureType isAbstract="false">
  <S100FC:name>Bridge</S100FC:name>
  -<S100FC:definition>
    (1) An elevated structure extending across or over the weather deck of a vessel, or
    water, railroad, etc., to provide a roadway for vehicles or pedestrians.
  </S100FC:definition>
  <S100FC:code>Bridge</S100FC:code>
  -<S100FC:remarks>
    A bridge may consist of portions which cover the land and the water.
  </S100FC:remarks>
  <S100FC:alias>BRIDGE</S100FC:alias>
  -<S100FC:definitionReference>
    <S100FC:sourceIdentifier>215</S100FC:sourceIdentifier>
    <S100FC:definitionSource ref="IHOREG"/>
  </S100FC:definitionReference>
 +<S100FC:attributeBinding sequential="false"></S100FC:attributeBinding>
```

```
-<S100FC:informationBinding roleType="association">
  -<S100FC:multiplicity>
    <S100Base:lower>0</S100Base:lower>
    <S100Base:upper xsi:nil="false" infinite="false">1</S100Base:upper>
  </S100FC:multiplicity>
  <S100FC:association ref="AdditionalInformation"/>
  <S100FC:role ref="providesInformation"/>
  <S100FC:informationType ref="ContactDetails"/>
  <S100FC:informationType ref="NauticalInformation"/>
  <S100FC:informationType ref="NonStandardWorkingDay"/>
  <S100FC:informationType ref="ServiceHours"/>
</S100FC:informationBinding>
```

Example
Additional Information

Feature Type
Bridge

Information Associations in the Feature Catalogue Example *Additional Information*

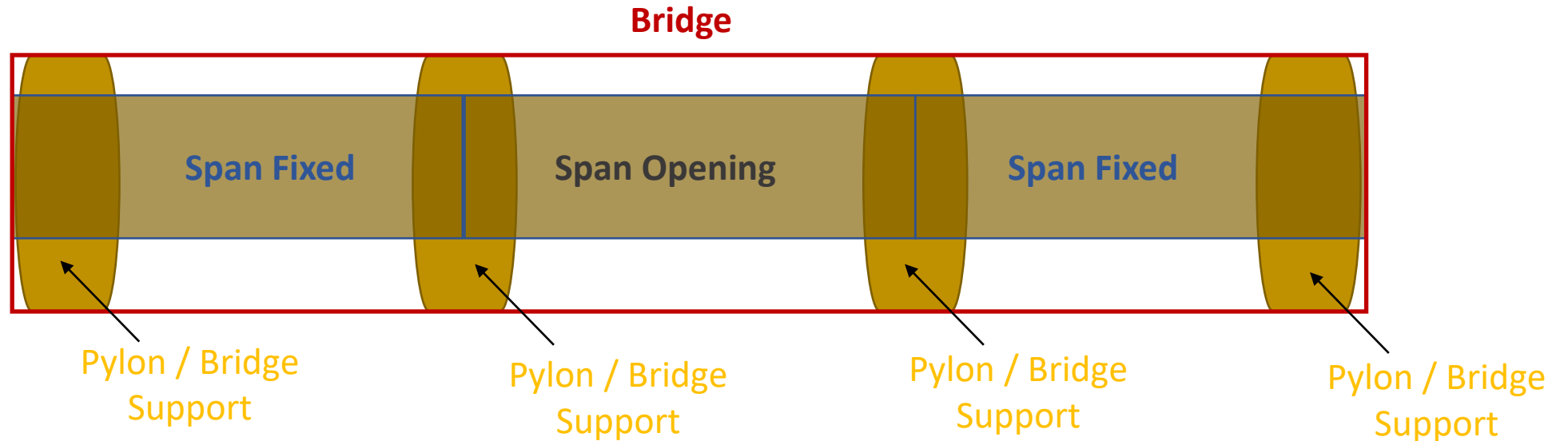## Bridge


```
<S100FC:informationBinding roleType="association">
    <S100FC:multiplicity>
        <S100Base:lower>0</S100Base:lower>
        <S100Base:upper xsi:nil="false" infinite="false">1</S100Base:upper>
    </S100FC:multiplicity>
    <S100FC:association ref="AdditionalInformation"/>
    <S100FC:role ref="providesInformation"/>
    <S100FC:informationType ref="ContactDetails"/>
    <S100FC:informationType ref="NauticalInformation"/>
    <S100FC:informationType ref="NonStandardWorkingDay"/>
    <S100FC:informationType ref="ServiceHours"/>
</S100FC:informationBinding>
```

Referenced item	Role of referenced item	Main item
ContactDetails	provides information (for)	*Bridge*

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Feature Association

Example *Bridge Aggregation*

Bridge

Span Fixed   Span Opening   Span Fixed

Pylon / Bridge Support   Pylon / Bridge Support   Pylon / Bridge Support   Pylon / Bridge Support

Bridge Aggregation and roles:

- **Bridge** consists of *PylonBridgeSupport* (4), *SpanFixed* (2), *SpanOpening* (1)
- **SpanFixed** is component of Bridge
- **SpanOpening** is component of Bridge
- **PylonBridgeSupport** is component of Bridge

Feature Associations in the Feature Catalogue

Example
Bridge Aggregation

Feature Type
Bridge

Feature Associations in the Feature Catalogue Example *Bridge Aggregation*

Bridge

```
+<S100FC:featureBinding roleType="association"></S100FC:featureBinding>
-<S100FC:featureBinding roleType="aggregation">
  -<S100FC:multiplicity>
      <S100Base:lower>0</S100Base:lower>
      <S100Base:upper xsi:nil="true" infinite="true"/>
  </S100FC:multiplicity>
  <S100FC:association ref="BridgeAggregation"/>
  <S100FC:role ref="consistsOf"/>
  <S100FC:featureType ref="PylonBridgeSupport"/>
  <S100FC:featureType ref="SpanFixed"/>
  <S100FC:featureType ref="SpanOpening"/>
</S100FC:featureBinding>
+<S100FC:featureBinding roleType="composition"></S100FC:featureBinding>
```

Referenced item	Role of Main item	Main item
PylonBridgeSupport	consists of	*Bridge*
SpanFixed	consists of	*Bridge*
SpanOpening	consists of	*Bridge*

Feature Associations in the Feature Catalogue

```xml
-<S100FC:S100_FC_FeatureType isAbstract="false">
  <S100FC:name>Span Fixed</S100FC:name>
 -<S100FC:definition>
     A fixed component of the deck of a bridge spanning successive bridge piers.
  </S100FC:definition>
  <S100FC:code>SpanFixed</S100FC:code>
  <S100FC:alias>BRIDGE</S100FC:alias>
 -<S100FC:definitionReference>
    <S100FC:sourceIdentifier>216</S100FC:sourceIdentifier>
    <S100FC:definitionSource ref="IHOREG"/>
  </S100FC:definitionReference>
 -<S100FC:attributeBinding sequential="false">
   -<S100FC:multiplicity>
```

```xml
-<S100FC:featureBinding roleType="aggregation">
  -<S100FC:multiplicity>
     <S100Base:lower>0</S100Base:lower>
     <S100Base:upper xsi:nil="false" infinite="false">1</S100Base:upper>
   </S100FC:multiplicity>
   <S100FC:association ref="BridgeAggregation"/>
   <S100FC:role ref="componentOf"/>
   <S100FC:featureType ref="Bridge"/>
  </S100FC:featureBinding>
```

Example
Bridge Aggregation

Feature Type
Span Fixed

SevenCs

Feature Associations in the Feature Catalogue Example *Bridge Aggregation*

SpanFixed

```
<S100FC:featureBinding roleType="aggregation">
  <S100FC:multiplicity>
    <S100Base:lower>0</S100Base:lower>
    <S100Base:upper xsi:nil="false" infinite="false">1</S100Base:upper>
  </S100FC:multiplicity>
  <S100FC:association ref="BridgeAggregation"/>
  <S100FC:role ref="componentOf"/>
  <S100FC:featureType ref="Bridge"/>
</S100FC:featureBinding>
```

Referenced item	Role of **Main item**	Main item
Bridge	component of	*SpanFixed*

Inconsistent use of association roles in FC

Information Associations – role defines function of referenced item

Referenced item	Role of referenced item	Main item
ContactDetails	provides information (for)	*Bridge*

Feature Associations – role defines function of main item

Referenced item	Role of Main item	Main item
PylonBridgeSupport	consists of	*Bridge*
SpanFixed	consists of	*Bridge*
SpanOpening	consists of	*Bridge*

Referenced item	Role of Main item	Main item
Bridge	component of	*SpanFixed*

Conclusions and recommendations

- in the S-101 FC 1.1.0 …

  - … Information Association roles are used correctly at the level of feature type definition

  - … Feature Association roles are not used correctly at the level of feature type definition

- apparently, roles are inverted in the latter case

=> correct the S-101 FC 1.1.0 and fix the inverted roles

Thank You

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