

Attachment 1 to ToR for Bridge Analytical Module – Bridge Management System Data Model

Skopje, 16.6.2021

TABLE OF CONTENTS		PAGE
1	INTRODUCTION	3
2	DATA TABLES.....	4
2.1	Bridge inventory data tables.....	4
2.2	Bridge condition data tables.....	7
2.3	Code list tables.....	10
3	SCHEMATIC PRESENTATION OF DATA TABLES.....	14
4	XSD SCHEMA WITH XML	18
4.1	XSD schema.....	18
4.2	XML example	25

LIST OF TABLES		PAGE
Table 1:	BMS_STRUCTURE - definition of basic structure data.....	4
Table 2:	BMS_STRUCTURE_MATERIAL - definition of structure material.....	5
Table 3:	BMS_STRUCTURE_SYSTEM - definition of structure system.....	5
Table 4:	BMS_STRUCTURE_SPANS - definition of structure spans	5
Table 5:	BMS_STRUCTURE_PIERS - definition of structure piers	6
Table 6:	<i>BMS_STRUCTURE_MAINTENANCE - definition of structure maintenance</i>	<i>6</i>
Table 7:	<i>BMS_DOCS - table with links to documents, photos, ACAD, archive docs.....</i>	<i>6</i>
Table 8:	<i>BMS_LOCATION_DATA - definition of structure location (with coordinates and with road section and mileage).....</i>	<i>6</i>
Table 9:	BMS_INSPECTION - definition of all structure inspections	7
Table 10:	<i>BMS_INSPECTORS - definition of inspectors and their responsibilities</i>	<i>7</i>
Table 11:	<i>BMS_STRUCTURE_ELEMENTS - definition of structure elements.....</i>	<i>8</i>
Table 12:	<i>BMS_CONDITION_ELEMENT - definition of condition of structure elements.....</i>	<i>8</i>
Table 13:	<i>BMS_CONDITION_STRUCTURE - definition of condition of structure</i>	<i>8</i>
Table 14:	<i>BMS_CONDITION_STRUCTURE_MEASURES - definition of structure measures</i>	<i>9</i>
Table 15:	<i>BMS_DAMAGE_RECORDING - definition of damages on structure elements.....</i>	<i>9</i>
Table 16:	<i>BMS_DAMAGE_RECORDING_ATTRIBUTES - definition of attributes for damage recording on structure elements</i>	<i>9</i>
Table 17:	LIST_STRUCTURE_TYPE.....	10
Table 18:	LIST_CROSSING_TYPE	10
Table 19:	LIST_MATERIAL	10
Table 20:	LIST_STRUCTURE_SYSTEM.....	10
Table 21:	LIST_SUBSTRUCTURE_TYPE	11
Table 22:	LIST_DOC_TYPE.....	11
Table 23:	LIST_WEATHER	11

Table 24: LIST_INSPECTOR 11

Table 25: LIST_GROUP_ELEMENTS..... 11

Table 26: LIST_LOCATION..... 11

Table 27: LIST_ELEMENTS 12

Table 28: LIST_ECI..... 12

Table 29: LIST_BCI 13

Table 30: LIST_RECC_M 13

Table 31: LIST_DAMAGE_TYPE..... 13

1 INTRODUCTION

In this document, basic information on the Bridge Management System Data model is presented. The purpose of the document is to give additional information on data that will be collected in the bridge inspection process and will be available for BAM SW. the same data model is used also to design a Bridge data collection SW and RAMS upgrade for storing bridge data in central database.

In the data model are presented definition of tables for bridge inventory data, bridge condition data and associated code lists. In this Appendix is described:

- Bridge inventory data and bridge condition data tables
- Schematic presentation of tables with the relations between them
- Definition of XSD schema with XML example needed for data exchange between central BMS IT system and BDC SW

2 DATA TABLES

Data model definition for bridge inventory data and bridge condition data tables were made in Enterprise Architect software. In this Appendix, there is just a description of tables from Enterprise Architect, a complete Enterprise Architect project will be delivered to the selected Consultant at the start of the project.

2.1 Bridge inventory data tables

Table 1: BMS_STRUCTURE - definition of basic structure data

FIELD NAME	FIELD TYPE	DESCRIPTION
Structure_ID	Number	Unique record ID
Structure_Code	Text 20	Unique bridge identification number, composed of 7 characters (Example M001301 - first bridge on the section 0013)
ID_Structure_Type	Integer	Type of object selected from code list
Name	Text 128	Name of structure
ID_Crossing_Type	Integer	Crossing type selected from code list
Crossing_Name	Text 128	Name of river, obstacle, ...
Urban_Area	Text 128	Nearest urban area name
Road_Number	Text 20	Road number (A1, P1204,...)
Total_Length	Float	Total length of the structure (between first and last expansion joints) - (m)
Skewness	Float	Skewness of the structure (°)
Length_Abutments	Float	Perpendicular length between abutments - (m)
Number_Spans	Integer	Number of spans
Pavements_Width	Float	Pavement width, without sidewalks
Width_Sidewalk_L	Float	Width of right sidewalk
Width_Sidewalk_R	Float	Width of left sidewalk
Lanes_Num	Integer	Number of lanes
Piers_Num	Integer	Number of piers
Clearance	Float	Heigh of free profile (minimum)

Year_Constr	Integer	Year of construction
TLC_Design	Number	Maximum traffic load, that bridge can be subjected based on design (kN)
TLC_Assesment	Number	Maximum traffic load, that bridge can be subjected based on reliability assessment (kN)
Limits_Other	Text	Any other limits, e.g. speed limit
Remark	TEXT (blob)	Remarks, comments, ...
Dat_Zac	Date	System date of inserted record in BMS database
Dat_Kon	Date	System date of setting record in history in BMS database
User_Zac	Text 128	User who inserted record in BMS database
User_Kon	Text 128	User who set record to history in BMS database

Table 2: BMS_STRUCTURE_MATERIAL - definition of structure material

FIELD NAME	FIELD TYPE	DESCRIPTION
Structure_Material_ID	Number	Unique record ID
Structure_Code	Text 20	Relation to record from table BMS_STRUCTURE
ID_Material	Integer	Type of material selected from code list
Primary	Integer	1 - primary, 2 - not primary
Remark	Text (blob)	Remarks, comments, ...
Dat_Zac	Date	System date of inserted record in BMS database
Dat_Kon	Date	System date of setting record in history in BMS database
User_Zac	Text 128	User who inserted record in BMS database
User_Kon	Text 128	User who set record to history in BMS database

Table 3: BMS_STRUCTURE_SYSTEM - definition of structure system

FIELD NAME	FIELD TYPE	DESCRIPTION
Structure_System_ID	Number	Unique record ID
Structure_Code	Text 20	Relation to record from table BMS_STRUCTURE
Id_Structure_System	Integer	Type of Structural System selected from code list
Primary	Integer	1 - primary, 2 - not primary
Remark	Text (blob)	Remarks, comments, ...
Dat_Zac	Date	System date of inserted record in BMS database
Dat_Kon	Date	System date of setting record in history in BMS database
User_Zac	Text	User who inserted record in BMS database
User_Kon	Text	User who set record to history in BMS database

Table 4: BMS_STRUCTURE_SPANS - definition of structure spans

FIELD NAME	FIELD TYPE	DESCRIPTION
Structure_Span_ID	Number	Unique record ID

Structure_Code	Text 20	Relation to record from table BMS_STRUCTURE
Span_Number	Integer	Consecutive span number inside of structure
Length	Number	Length of span X (m)
Dat_Zac	Date	System date of inserted record in BMS database
Dat_Kon	Date	System date of setting record in history in BMS database
User_Zac	Text	User who inserted record in BMS database
User_Kon	Text	User who set record to history in BMS database

Table 5: BMS_STRUCTURE_PIEERS - definition of structure piers

FIELD NAME	FIELD TYPE	DESCRIPTION
Structure_Piers_ID	Number	Unique record ID
Structure_Code	Text 20	Relation to record from table BMS_STRUCTURE
Piers_Number	Integer	Consecutive pier number inside of structure
ID_Substructure_Type	Integer	Substructure type selected from code list
Height	Number	Height of pier X (m)
Dat_Zac	Date	System date of inserted record in BMS database
Dat_Kon	Date	System date of setting record in history in BMS database
User_Zac	Text	User who inserted record in BMS database
User_Kon	Text	User who set record to history in BMS database

Table 6: BMS_STRUCTURE_MAINTENANCE - definition of structure maintenance

FIELD NAME	FIELD TYPE	DESCRIPTION
Structure_Maintenance_ID	Number	Unique record ID
Structure_Code	Text 20	Relation to record from table BMS_STRUCTURE
Year	Integer	Year of maintenance or reconstruction
Remark	Text (blob)	Remarks, comments, ...
Dat_Zac	Date	System date of inserted record in BMS database
User_Zac	Text	User who inserted record in BMS database

Table 7: BMS_DOCS - table with links to documents, photos, ACAD, archive docs

FIELD NAME	FIELD TYPE	DESCRIPTION
Docs_ID	Number	Unique record ID
Table_Name	Text 128	Name of table with object ID
Object_ID	Text 128	Unique ID or code of object inside of table
ID_Doc_Type	Number	Document type (document, photo, ..)
Link	Text 256	Link to the document, photo, ...
Description	Text 256	Description of document
Dat_Zac	Date	System date of inserted record in BMS database
User_Zac	Text	User who inserted record in BMS database

Table 8: BMS_LOCATION_DATA - definition of structure location (with coordinates and with road section and mileage)

FIELD NAME	FIELD TYPE	DESCRIPTION
------------	------------	-------------

Location_Data_ID	Number	Unique record ID
Structure_Code	Text 20	Relation to record from table BMS_STRUCTURE
Road_Number	Text 20	Road number (A1, P1204,...)
Road_Section_Number	Text 20	Road section number (0001, 0607,...)
Mileage_Start	Number	Start mileage of object
Mileage_End	Number	End mileage of object
X_Start	Float	X coordinate of start of object in Macedonian coordinate system
Y_Start	Float	Y coordinate of start of object in Macedonian coordinate system
X_End	Float	X coordinate of end of object in Macedonian coordinate system
Y_End	Float	Y coordinate of end of object in Macedonian coordinate system
Primary_Location	Integer	1 -YES, 2-NO
Geometry_Display	Integer	1 -YES, 2-NO
Structure_Geometry	Geometry	Geometry of object written in BMS database
Dat_Zac	Date	System date of inserted record in BMS database
Dat_Kon	Date	System date of setting record in history in BMS database
User_Zac	Text	User who inserted record in BMS database
User_Kon	Text	User who set record to history in BMS database

2.2 Bridge condition data tables

Table 9: BMS_INSPECTION - definition of all structure inspections

FIELD NAME	FIELD TYPE	DESCRIPTION
Inspection_ID	Number	Unique record ID
Structure_Code	Text 20	Relation to record from table BMS_STRUCTURE
Last_Inspection_Date	Date	Date of last inspection
Inspection_Date	Date	Date of current inspection
ID_Weather_Type	Integer	Weather type selected from code list
Temperature	Float	Temperature (°C)
Remark	Text (blob)	Remarks, comments, ...
Dat_Zac	Date	System date of inserted record in BMS database
Dat_Kon	Date	System date of setting record in history in BMS database
User_Zac	Text 128	User who inserted record in BMS database
User_Kon	Text 128	User who set record to history in BMS database

Table 10: BMS_INSPECTORS - definition of inspectors and their responsibilities

FIELD NAME	FIELD TYPE	DESCRIPTION
Inspector_ID	Number	Unique record ID
Inspection_ID	Number	Relation to record from table BMS_INSPECTION
ID_Inspector	Integer	Inspector selected from code list

Responsibility	Integer	1 - main inspector; 2 - support inspector
Dat_Zac	Date	System date of inserted record in BMS database
Dat_Kon	Date	System date of setting record in history in BMS database
User_Zac	Text 128	User who inserted record in BMS database
User_Kon	Text 128	User who set record to history in BMS database

Table 11: BMS_STRUCTURE_ELEMENTS - definition of structure elements

FIELD NAME	FIELD TYPE	DESCRIPTION
Element_ID	Number	Unique record ID
Structure_Code	Text 20	Relation to record from table BMS_STRUCTURE
ID_Group_Elements	Integer	Automatically selected from group element code list on the base of selected element
ID_Location	Integer	Location selected from code list
Location_number	Integer	Counter that defines the location for spans, piers, abutment, approach
ID_Element	Integer	Element selected from code list
ID_Material	Integer	Material selected from code list
Remark	Tex (blob)	Remarks, comments, ...
Dat_Zac	Date	System date of inserted record in BMS database
Dat_Kon	Date	System date of setting record in history in BMS database
User_Zac	Text 128	User who inserted record in BMS database
User_Kon	Text 128	User who set record to history in BMS database

Table 12: BMS_CONDITION_ELEMENT - definition of condition of structure elements

FIELD NAME	FIELD TYPE	DESCRIPTION
Condition_Element_ID	Number	Unique record ID
Element_ID	Number	Relation to record from table BMS_STRUCTURE_ELEMENTS
Inspection_ID	Number	Relation to record from table BMS_INSPECTION
ID_ECI	Integer	Condition index for element regarding damage catalogue
Remark	Text (blob)	Remarks, comments, ...
Dat_Zac	Date	System date of inserted record in BMS database
Dat_Kon	Date	System date of setting record in history in BMS database
User_Zac	Text 128	User who inserted record in BMS database
User_Kon	Text 128	User who set record to history in BMS database

Table 13: BMS_CONDITION_STRUCTURE - definition of condition of structure

FIELD NAME	FIELD TYPE	DESCRIPTION
Condition_Structure_ID	Number	Unique record ID
Structure_Code	Text	Relation to record from table BMS_STRUCTURE
Inspection_ID	Number	Relation to record from table BMS_INSPECTION
ID_BCI	Integer	Condition index for entire structure selected from code list

Condition	Text (blob)	Description of the current condition state
Changes	Text (blob)	Description of the changes from last inspection
Remark	Text (blob)	Remarks, comments, ...
Dat_Zac	Date	System date of inserted record in BMS database
Dat_Kon	Date	System date of setting record in history in BMS database
User_Zac	Text 128	User who inserted record in BMS database
User_Kon	Text 128	User who set record to history in BMS database

Table 14: BMS_CONDITION_STRUCTURE_MEASURES - definition of structure measures

FIELD NAME	FIELD TYPE	DESCRIPTION
Condition_Structure_Measure_ID	Number	Unique record ID
Location	Integer	1 - structure, 2 - element
Condition_Structure_Location_ID	Number	Reference to table BMS_CONDITION_STRUCTURE
ID_Recc_M	Integer	Recommended measures elected from code list
Remark	Text (blob)	Remarks, comments, ...
Dat_Zac	Date	System date of inserted record in BMS database
Dat_Kon	Date	System date of setting record in history in BMS database
User_Zac	Text 128	User who inserted record in BMS database
User_Kon	Text 128	User who set record to history in BMS database

Table 15: BMS_DAMAGE_RECORDING - definition of damages on structure elements

FIELD NAME	FIELD TYPE	DESCRIPTION
Damage_Recording_ID	Number	Unique record ID
Condition_Element_ID	Number	Reference to table BMS_CONDITION_ELEMENT
ID_Damage_type	Integer	Type of damages from code list
Attribute1	Float	Damage value on the base of code list depending on element, material and damage type
Attribute2	Float	Damage value on the base of code list depending on element, material and damage type
Attribute3	Float	Damage value on the base of code list depending on element, material and damage type
Attribute4	Float	Damage value on the base of code list depending on element, material and damage type
Attribute5	Text	Damage value on the base of code list depending on element, material and damage type
Attribute6	Text	Damage value on the base of code list depending on element, material and damage type

Table 16: BMS_DAMAGE_RECORDING_ATTRIBUTES - definition of attributes for damage recording on structure elements

ID Element	ID Material	ID Damage Type	Attribute 1	Attribute 2	Attribute 3	Attribute 4	Attribute 5	Attribute 6
1-	1	1	Max	/	/	/	Type	Comment

11,14,22			width [mm]					
1- 11,14,22	1	2	reduced cross- section area [%]	/	/	/	Scope	Comment
1- 11,14,22	1	3	Area [m ²]	/	/	/	/	Comment
1- 11,14,22	1	4	/	/	/	/	/	Comment
...

2.3 Code list tables

Table 17: LIST_STRUCTURE_TYPE

ID_Structure_Type	Abbreviation	Structure_Type
1	M	Bridge
2	N	Overpass
3	P	Underpass
4	V	Viaduct
9	O	Other

Table 18: LIST_CROSSING_TYPE

ID_Crossing_Type	Abbreviation	Crossing_Type
1	V	Water
2	P	Road
3	Z	Railway
4	N	Urban areas
9	O	Others

Table 19: LIST_MATERIAL

ID_Material	Material
1	Concrete
2	Steel
3	Timber
4	Masonry
99	Other

Table 20: LIST_STRUCTURE_SYSTEM

ID_Structure_System	Structure_System
1	Beams/girders
2	Integral/frame type
3	Slab
4	Trusses

5	Vault
6	Arc

Table 21: LIST_SUBSTRUCTURE_TYPE

ID_Substructure_Type	Type
1	Abutment
2	Pier

Table 22: LIST_DOC_TYPE

ID_Doc_Type	Type
1	Document
2	Photo
3	ACAD
4	Digital Archive file
9	Other

Table 23: LIST_WEATHER

ID_Weather_Type	Weather_Type
1	Sunny
2	Cloudy
...	...

Table 24: LIST_INSPECTOR

ID_Inspector	Inspector_Name
1	Inspector 1
2	Inspector 2
3	Inspector 3
...	...

Table 25: LIST_GROUP_ELEMENTS

ID_Group_Elements	Group_Elements
1	Support-structure
2	Superstructure
3	Roadway
4	Equipment

Table 26: LIST_LOCATION

ID_Location	Location
1	General
2	Approach
3	Abutment

4	Pier
5	Span

Table 27: LIST_ELEMENTS

ID_Element	Element	ID_Group_Elements
1	Foundation	1
2	Abutments	1
3	Pier/Intermediate support	1
4	Wing wall and retaining-supporting wall	1
5	Slab	2
6	Main girder/beam	2
7	Crossbeam	2
8	Box girder	2
9	Arch and vault	2
10	Truss	2
11	Sidewalk structure	2
12	Approach to the bridge	3
13	Pavement and waterproofing	3
14	Prefabricated front panel+sidewalk+kerbs+joints	3
15	Steel bearing	4
16	Concrete Bearing	4
17	Timber bearing	4
18	Neoprene bearing	4
19	Teflon bearing	4
20	Lead bearing	4
21	Expansion joint	4
22	Railing and crash barriers	4
23	Lighting pole and traffic sign	4
24	Pipeline	4
25	Drainage system	4

Table 28: LIST_ECI

ID_ECI	ECI
1	1
2	2
3	3
4	4
5	Not inspected

Table 29: LIST_BCI

ID_BCI	BCI
1	1
2	2
3	3
4	4
5	5
6	Not inspected

Table 30: LIST_RECC_M

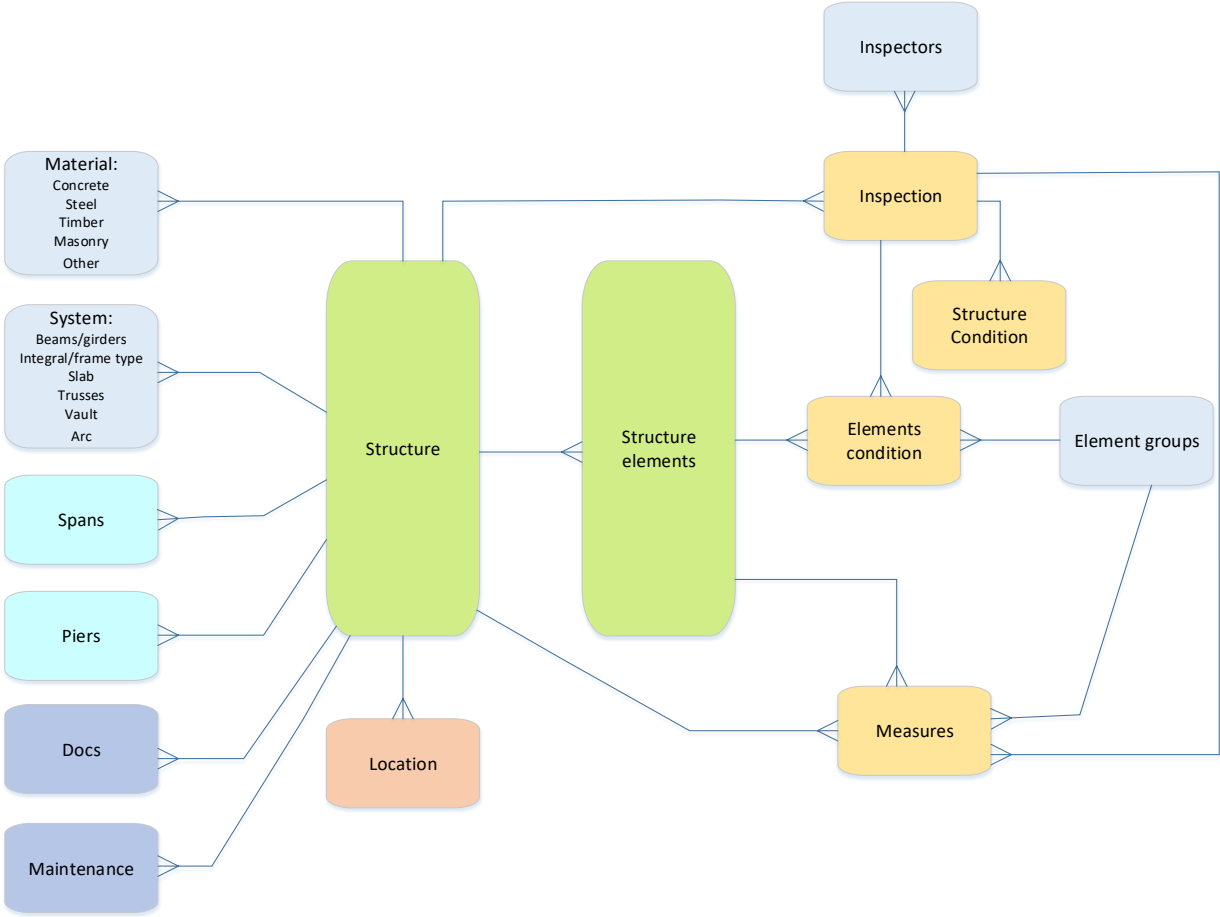
ID_Recc_M	Location	Recc_M
1	1	Rehabilitation
2	1	Replacement
3	1	In-detail inspection
4	1	Regular maintenance
5	3	Local maintenance
6	3	Repair
7	3	Repair with strengthening
8	3	Replacement/change
9	3	In-detail inspection

Table 31: LIST_DAMAGE_TYPE

ID_Damage_Type	Damage type
1	Crack
2	Corrosion
3	Delamination
4	Leackeage
...	...

3 SCHEMATIC PRESENTATION OF DATA TABLES

Schematic presentation of main tables and basic relationships between structure data, structure elements and inspections.



Bridge inventory database model – thematically grouped tables (part 1).

BMS_STRUCTURE	BMS_STRUCTURE_MATERIAL	BMS_STRUCTURE_SPANS
Structure_ID	Structure_Material_ID	Structure_Span_ID
Structure_Code	Structure_Code	Structure_Code
ID_Structure_Type	ID_Material	Span_Number
Name	Primary	Length
ID_Crossing_Type	Remark	Dat_Zac
Crossing_Name	Dat_Kon	Dat_Kon
Urban_Area	Dat_Kon	User_Zac
Road_Number	User_Zac	User_Kon
Total_Length	User_Kon	
Skewness		
Length_Abutments		
Number_Spans		
Pavements_Width		
Width_Sidewalk_L		
Width_Sidewalk_R		
Lanes_Num		
Piers_Num		
Clearance		
Year_Constr		
TLC_Design		
TLC_Assesment		
Limits_Other		
Remark		
Dat_Zac		
Dat_Kon		
User_Zac		
User_Kon		

BMS_STRUCTURE_ELEMENTS	BMS_STRUCTURE_PERS	BMS_STRUCTURE_SYSTEM
Element_ID	Structure_Piers_ID	Structure_System_ID
Structure_Code	Structure_Code	Structure_Code
ID_Group_Elements	Piers_Number	Id_Structure_System
ID_Location	ID_Substructure_Type	Primary
Location_number	Height	Remark
ID_Element	Dat_Zac	Dat_Zac
ID_Material	Dat_Kon	Dat_Kon
Remark	User_Zac	User_Zac
Dat_Zac	User_Kon	User_Kon
Dat_Kon		
User_Zac		
User_Kon		

Administrative and technical data

BMS_STRUCTURE_MAINTENANCE
Structure_Maintenance_ID
Structure_Code
Year
Remark
Dat_Zac
User_Zac

Maintenance data

BMS_DOCS
Docs_ID
Table_Name
Object_ID
ID_Doc_Type
Link
Description
Dat_Zac
User_Zac

Documents

BMS_LOCATION_DATA
Location_Data_ID
Structure_Code
Road_Number
Road_Section_Number
Mileage_Start
Mileage_End
X_Start
Y_Start
X_End
Y_End
Primary_Location
Geometry_Display
Structure_Geometry
Dat_Zac
Dat_Kon
User_Zac
User_Kon

Bridge condition database model – thematically grouped tables (part 2).

BMS_CONDITION_STRUCTURE	BMS_CONDITION_ELEMENT
Condition_Structure_ID	Condition_Element_ID
Structure_Code	Element_ID
Inspection_ID	Inspection_ID
ID_BCI	ID_ECI
Condition	Remark
Changes	Dat_Zac
Remark	Dat_Kon
Dat_Zac	User_Zac
Dat_Kon	User_Kon
User_Zac	
User_Kon	

Conditions

BMS_INSPECTION	BMS_INSPECTORS
Inspection_ID	Inspector_ID
Structure_Code	Inspection_ID
Last_Inspection_Date	ID_Inspector
Inspection_Date	Responsibility
ID_Weather_Type	Dat_Zac
Temperature	Dat_Kon
Remark	User_Zac
Dat_Zac	User_Kon
Dat_Kon	
User_Zac	
User_Kon	

Inspection data

BMS_CONDITION_STRUCTURE_MEASURES
Condition_Structure_Measure_ID
Location
Condition_Structure_Location_ID
ID_Recc_M
U_S
Dat_Zac
Dat_Kon
User_Zac
User_Kon

Condition structure measures

4 XSD SCHEMA WITH XML

XML specification defines exchange data format for bridge data. The XML exchange format will be primary use for delivering bridge inventory and condition data collected in bridge survey but also to distribute existing bridge data from BMS central IT system to BDC SW used for field inspections.

XSD Schema set the structure of the exchanged data: elements, attribute of elements and also values for code lists. It is created with Common Information Model (CIM) standards. CIM Schema delivers semantically detailed, object-oriented model descriptions for all managed elements. It serves for validation of XML file when it is prepared for every structure separately.

Complete data model for bridge inventory data and bridge condition data, and also class model which defines XSD schema, will be delivered to the selected Consultant at the beginning of the project.

4.1 XSD schema

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:sawsdl="http://www.w3.org/ns/sawsdl" xmlns:m="http://iec.ch/TC57/xml_bms_cim#"
targetNamespace="http://iec.ch/TC57/xml_bms_cim#" elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:element name="xml_bms_cim" type="m:xml_bms_cim"/>
  <xs:complexType name="xml_bms_cim">
    <xs:sequence>
      <xs:element name="BMS_CONDITION_STRUCTURE" type="m:BMS_CONDITION_STRUCTURE" minOccurs="1" maxOccurs="1"/>
      <xs:element name="BMS_INSPECTION" type="m:BMS_INSPECTION" minOccurs="1" maxOccurs="1"/>
      <xs:element name="BMS_INSPECTORS" type="m:BMS_INSPECTORS" minOccurs="1" maxOccurs="unbounded"/>
      <xs:element name="BMS_LOCATION_DATA" type="m:BMS_LOCATION_DATA" minOccurs="1" maxOccurs="unbounded"/>
      <xs:element name="BMS_STRUCTURE" type="m:BMS_STRUCTURE" minOccurs="1" maxOccurs="1"/>
      <xs:element name="BMS_STRUCTURE_ELEMENTS" type="m:BMS_STRUCTURE_ELEMENTS" minOccurs="1" maxOccurs="unbounded"/>
      <xs:element name="BMS_STRUCTURE_MAINTENANCE" type="m:BMS_STRUCTURE_MAINTENANCE" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="BMS_STRUCTURE_MATERIAL" type="m:BMS_STRUCTURE_MATERIAL" minOccurs="1" maxOccurs="unbounded"/>
      <xs:element name="BMS_STRUCTURE_PIERS" type="m:BMS_STRUCTURE_PIERS" minOccurs="1" maxOccurs="unbounded"/>
      <xs:element name="BMS_STRUCTURE_SPANS" type="m:BMS_STRUCTURE_SPANS" minOccurs="1" maxOccurs="unbounded"/>
      <xs:element name="BMS_STRUCTURE_SYSTEM" type="m:BMS_STRUCTURE_SYSTEM" minOccurs="1" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="BMS_CONDITION_STRUCTURE" sawsdl:modelReference="#BMS_CONDITION_STRUCTURE">
    <xs:sequence>
      <xs:element name="Changes" minOccurs="1" maxOccurs="1" type="xs:string"
sawsdl:modelReference="#BMS_CONDITION_STRUCTURE.Changes"/>
      <xs:element name="Condition" minOccurs="1" maxOccurs="1" type="xs:string"
sawsdl:modelReference="#BMS_CONDITION_STRUCTURE.Condition"/>
      <xs:element name="Remark" minOccurs="1" maxOccurs="1" type="xs:string" sawsdl:modelReference="#BMS_CONDITION_STRUCTURE.Remark"/>
      <xs:element name="ID_BCI" minOccurs="1" maxOccurs="1" type="m:ID_BCI" sawsdl:modelReference="#BMS_CONDITION_STRUCTURE.ID_BCI"/>
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

```

</xs:complexType>
<xs:complexType name="BMS_INSPECTION" sawsdl:modelReference="#BMS_INSPECTION">
  <xs:sequence>
    <xs:element name="Inspection_Date" minOccurs="1" maxOccurs="1" type="xs:date"
sawsdl:modelReference="#BMS_INSPECTION.Inspection_Date"/>
    <xs:element name="Last_Inspection_Date" minOccurs="1" maxOccurs="1" type="xs:date"
sawsdl:modelReference="#BMS_INSPECTION.Last_Inspection_Date"/>
    <xs:element name="Remark" minOccurs="1" maxOccurs="1" type="xs:string" sawsdl:modelReference="#BMS_INSPECTION.Remark"/>
    <xs:element name="Temperature" minOccurs="1" maxOccurs="1" type="xs:double"
sawsdl:modelReference="#BMS_INSPECTION.Temperature"/>
    <xs:element name="ID_Weather_Type" minOccurs="1" maxOccurs="1" type="m:ID_Weather_Type"
sawsdl:modelReference="#BMS_INSPECTION.ID_Weather_Type"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="BMS_INSPECTORS" sawsdl:modelReference="#BMS_INSPECTORS">
  <xs:sequence>
    <xs:element name="ID_Inspector" minOccurs="1" maxOccurs="1" type="m:ID_Inspector"
sawsdl:modelReference="#BMS_INSPECTORS.ID_Inspector"/>
    <xs:element name="Responsibility" minOccurs="1" maxOccurs="1" type="m:Responsibility"
sawsdl:modelReference="#BMS_INSPECTORS.Responsibility"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="BMS_LOCATION_DATA" sawsdl:modelReference="#BMS_LOCATION_DATA">
  <xs:sequence>
    <xs:element name="Mileage_End" minOccurs="1" maxOccurs="1" type="xs:integer"
sawsdl:modelReference="#BMS_LOCATION_DATA.Mileage_End"/>
    <xs:element name="Mileage_Start" minOccurs="1" maxOccurs="1" type="xs:integer"
sawsdl:modelReference="#BMS_LOCATION_DATA.Mileage_Start"/>
    <xs:element name="Road_Number" minOccurs="1" maxOccurs="1" type="xs:string"
sawsdl:modelReference="#BMS_LOCATION_DATA.Road_Number"/>
    <xs:element name="Road_Section_Number" minOccurs="1" maxOccurs="1" type="xs:string"
sawsdl:modelReference="#BMS_LOCATION_DATA.Road_Section_Number"/>
    <xs:element name="X_End" minOccurs="1" maxOccurs="1" type="xs:double" sawsdl:modelReference="#BMS_LOCATION_DATA.X_End"/>
    <xs:element name="X_Start" minOccurs="1" maxOccurs="1" type="xs:double" sawsdl:modelReference="#BMS_LOCATION_DATA.X_Start"/>
    <xs:element name="Y_End" minOccurs="1" maxOccurs="1" type="xs:double" sawsdl:modelReference="#BMS_LOCATION_DATA.Y_End"/>
    <xs:element name="Y_Start" minOccurs="1" maxOccurs="1" type="xs:double" sawsdl:modelReference="#BMS_LOCATION_DATA.Y_Start"/>
    <xs:element name="Geometry_Display" minOccurs="1" maxOccurs="1" type="m:Geometry_Display"
sawsdl:modelReference="#BMS_LOCATION_DATA.Geometry_Display"/>
    <xs:element name="Primary_Location" minOccurs="1" maxOccurs="1" type="m:Primary_Location"
sawsdl:modelReference="#BMS_LOCATION_DATA.Primary_Location"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="BMS_STRUCTURE" sawsdl:modelReference="#BMS_STRUCTURE">
  <xs:sequence>
    <xs:element name="Clearance" minOccurs="1" maxOccurs="1" type="xs:float" sawsdl:modelReference="#BMS_STRUCTURE.Clearance"/>
  </xs:sequence>
</xs:complexType>

```

```

        <xs:element name="Crossing_Name" minOccurs="1" maxOccurs="1" type="xs:string"
sawSDL:modelReference="#BMS_STRUCTURE.Crossing_Name"/>
        <xs:element name="Lanes_Num" minOccurs="1" maxOccurs="1" type="xs:integer" sawSDL:modelReference="#BMS_STRUCTURE.Lanes_Num"/>
        <xs:element name="Length_Abutments" minOccurs="1" maxOccurs="1" type="xs:float"
sawSDL:modelReference="#BMS_STRUCTURE.Length_Abutments"/>
        <xs:element name="Limits_Other" minOccurs="1" maxOccurs="1" type="xs:string"
sawSDL:modelReference="#BMS_STRUCTURE.Limits_Other"/>
        <xs:element name="Name" minOccurs="1" maxOccurs="1" type="xs:string" sawSDL:modelReference="#BMS_STRUCTURE.Name"/>
        <xs:element name="Number_Spans" minOccurs="1" maxOccurs="1" type="xs:integer"
sawSDL:modelReference="#BMS_STRUCTURE.Number_Spans"/>
        <xs:element name="Pavements_Width" minOccurs="1" maxOccurs="1" type="xs:float"
sawSDL:modelReference="#BMS_STRUCTURE.Pavements_Width"/>
        <xs:element name="Piers_Num" minOccurs="1" maxOccurs="1" type="xs:integer" sawSDL:modelReference="#BMS_STRUCTURE.Piers_Num"/>
        <xs:element name="Remark" minOccurs="1" maxOccurs="1" type="xs:string" sawSDL:modelReference="#BMS_STRUCTURE.Remark"/>
        <xs:element name="Road_Number" minOccurs="1" maxOccurs="1" type="xs:string" sawSDL:modelReference="#BMS_STRUCTURE.Road_Number"/>
        <xs:element name="Skewness" minOccurs="1" maxOccurs="1" type="xs:float" sawSDL:modelReference="#BMS_STRUCTURE.Skewness"/>
        <xs:element name="Structure_Code" minOccurs="1" maxOccurs="1" type="xs:string"
sawSDL:modelReference="#BMS_STRUCTURE.Structure_Code"/>
        <xs:element name="TLC_Assesment" minOccurs="1" maxOccurs="1" type="xs:integer"
sawSDL:modelReference="#BMS_STRUCTURE.TLC_Assesment"/>
        <xs:element name="TLC_Design" minOccurs="1" maxOccurs="1" type="xs:integer" sawSDL:modelReference="#BMS_STRUCTURE.TLC_Design"/>
        <xs:element name="Total_Length" minOccurs="1" maxOccurs="1" type="xs:float"
sawSDL:modelReference="#BMS_STRUCTURE.Total_Length"/>
        <xs:element name="Urban_Area" minOccurs="1" maxOccurs="1" type="xs:string" sawSDL:modelReference="#BMS_STRUCTURE.Urban_Area"/>
        <xs:element name="Width_Sidewalk_L" minOccurs="1" maxOccurs="1" type="xs:float"
sawSDL:modelReference="#BMS_STRUCTURE.Width_Sidewalk_L"/>
        <xs:element name="Width_Sidewalk_R" minOccurs="1" maxOccurs="1" type="xs:float"
sawSDL:modelReference="#BMS_STRUCTURE.Width_Sidewalk_R"/>
        <xs:element name="Year_Constr" minOccurs="1" maxOccurs="1" type="xs:integer"
sawSDL:modelReference="#BMS_STRUCTURE.Year_Constr"/>
        <xs:element name="ID_Crossing_Type" minOccurs="1" maxOccurs="1" type="m:ID_Crossing_Type"
sawSDL:modelReference="#BMS_STRUCTURE.ID_Crossing_Type"/>
        <xs:element name="ID_Structure_Type" minOccurs="1" maxOccurs="1" type="m:ID_Structure_Type"
sawSDL:modelReference="#BMS_STRUCTURE.ID_Structure_Type"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="BMS_STRUCTURE_ELEMENTS" sawSDL:modelReference="#BMS_STRUCTURE_ELEMENTS">
    <xs:sequence>
        <xs:element name="Location_Number" minOccurs="1" maxOccurs="1" type="xs:integer"
sawSDL:modelReference="#BMS_STRUCTURE_ELEMENTS.Location_Number"/>
        <xs:element name="Remark" minOccurs="1" maxOccurs="1" type="xs:string" sawSDL:modelReference="#BMS_STRUCTURE_ELEMENTS.Remark"/>
        <xs:element name="ID_ECI" minOccurs="1" maxOccurs="1" type="m:ID_ECI" sawSDL:modelReference="#BMS_STRUCTURE_ELEMENTS.ID_ECI"/>
        <xs:element name="ID_Element" minOccurs="1" maxOccurs="1" type="m:ID_Element"
sawSDL:modelReference="#BMS_STRUCTURE_ELEMENTS.ID_Element"/>
        <xs:element name="ID_Location" minOccurs="1" maxOccurs="1" type="m:ID_Location"
sawSDL:modelReference="#BMS_STRUCTURE_ELEMENTS.ID_Location"/>
    
```

```

        <xs:element name="ID_Material" minOccurs="1" maxOccurs="1" type="m:ID_Material"
sawSDL:modelReference="#BMS_STRUCTURE_ELEMENTS.ID_Material"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="BMS_STRUCTURE_MAINTENANCE" sawSDL:modelReference="#BMS_STRUCTURE_MAINTENANCE">
    <xs:sequence>
        <xs:element name="Remark" minOccurs="1" maxOccurs="1" type="xs:string"
sawSDL:modelReference="#BMS_STRUCTURE_MAINTENANCE.Remark"/>
        <xs:element name="Year" minOccurs="1" maxOccurs="1" type="xs:integer" sawSDL:modelReference="#BMS_STRUCTURE_MAINTENANCE.Year"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="BMS_STRUCTURE_MATERIAL" sawSDL:modelReference="#BMS_STRUCTURE_MATERIAL">
    <xs:sequence>
        <xs:element name="Primary" minOccurs="1" maxOccurs="1" type="xs:integer"
sawSDL:modelReference="#BMS_STRUCTURE_MATERIAL.Primary"/>
        <xs:element name="Remark" minOccurs="1" maxOccurs="1" type="xs:string" sawSDL:modelReference="#BMS_STRUCTURE_MATERIAL.Remark"/>
        <xs:element name="ID_Material" minOccurs="1" maxOccurs="1" type="m:ID_Material"
sawSDL:modelReference="#BMS_STRUCTURE_MATERIAL.ID_Material"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="BMS_STRUCTURE_PIERS" sawSDL:modelReference="#BMS_STRUCTURE_PIERS">
    <xs:sequence>
        <xs:element name="Height" minOccurs="1" maxOccurs="1" type="xs:float" sawSDL:modelReference="#BMS_STRUCTURE_PIERS.Height"/>
        <xs:element name="Piers_Number" minOccurs="1" maxOccurs="1" type="xs:integer"
sawSDL:modelReference="#BMS_STRUCTURE_PIERS.Piers_Number"/>
        <xs:element name="ID_Substructure_Type" minOccurs="1" maxOccurs="1" type="m:ID_Substructure_Type"
sawSDL:modelReference="#BMS_STRUCTURE_PIERS.ID_Substructure_Type"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="BMS_STRUCTURE_SPANS" sawSDL:modelReference="#BMS_STRUCTURE_SPANS">
    <xs:sequence>
        <xs:element name="Length" minOccurs="1" maxOccurs="1" type="xs:float" sawSDL:modelReference="#BMS_STRUCTURE_SPANS.Length"/>
        <xs:element name="Span_Number" minOccurs="1" maxOccurs="1" type="xs:integer"
sawSDL:modelReference="#BMS_STRUCTURE_SPANS.Span_Number"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="BMS_STRUCTURE_SYSTEM" sawSDL:modelReference="#BMS_STRUCTURE_SYSTEM">
    <xs:sequence>
        <xs:element name="Primary" minOccurs="1" maxOccurs="1" type="xs:integer" sawSDL:modelReference="#BMS_STRUCTURE_SYSTEM.Primary"/>
        <xs:element name="Remark" minOccurs="1" maxOccurs="1" type="xs:string" sawSDL:modelReference="#BMS_STRUCTURE_SYSTEM.Remark"/>
        <xs:element name="ID_Structure_System" minOccurs="1" maxOccurs="1" type="m:ID_Structure_System"
sawSDL:modelReference="#BMS_STRUCTURE_SYSTEM.ID_Structure_System"/>
    </xs:sequence>
</xs:complexType>
<xs:simpleType name="Geometry_Display" sawSDL:modelReference="#Geometry_Display">
    <xs:restriction base="xs:string">

```

```

        <xs:enumeration value="1" sawsdl:modelReference="#Geometry_Display.1"/>
        <xs:enumeration value="2" sawsdl:modelReference="#Geometry_Display.2"/>
    </xs:restriction>
</xs:simpleType>
<xs:simpleType name="ID_BCI" sawsdl:modelReference="#ID_BCI">
    <xs:restriction base="xs:string">
        <xs:enumeration value="1" sawsdl:modelReference="#ID_BCI.1"/>
        <xs:enumeration value="2" sawsdl:modelReference="#ID_BCI.2"/>
        <xs:enumeration value="3" sawsdl:modelReference="#ID_BCI.3"/>
        <xs:enumeration value="4" sawsdl:modelReference="#ID_BCI.4"/>
        <xs:enumeration value="5" sawsdl:modelReference="#ID_BCI.5"/>
        <xs:enumeration value="6" sawsdl:modelReference="#ID_BCI.6"/>
    </xs:restriction>
</xs:simpleType>
<xs:simpleType name="ID_Crossing_Type" sawsdl:modelReference="#ID_Crossing_Type">
    <xs:restriction base="xs:string">
        <xs:enumeration value="1" sawsdl:modelReference="#ID_Crossing_Type.1"/>
        <xs:enumeration value="2" sawsdl:modelReference="#ID_Crossing_Type.2"/>
        <xs:enumeration value="3" sawsdl:modelReference="#ID_Crossing_Type.3"/>
        <xs:enumeration value="4" sawsdl:modelReference="#ID_Crossing_Type.4"/>
        <xs:enumeration value="9" sawsdl:modelReference="#ID_Crossing_Type.9"/>
    </xs:restriction>
</xs:simpleType>
<xs:simpleType name="ID_ECI" sawsdl:modelReference="#ID_ECI">
    <xs:restriction base="xs:string">
        <xs:enumeration value="1" sawsdl:modelReference="#ID_ECI.1"/>
        <xs:enumeration value="2" sawsdl:modelReference="#ID_ECI.2"/>
        <xs:enumeration value="3" sawsdl:modelReference="#ID_ECI.3"/>
        <xs:enumeration value="4" sawsdl:modelReference="#ID_ECI.4"/>
        <xs:enumeration value="5" sawsdl:modelReference="#ID_ECI.5"/>
    </xs:restriction>
</xs:simpleType>
<xs:simpleType name="ID_Element" sawsdl:modelReference="#ID_Element">
    <xs:restriction base="xs:string">
        <xs:enumeration value="1" sawsdl:modelReference="#ID_Element.1"/>
        <xs:enumeration value="10" sawsdl:modelReference="#ID_Element.10"/>
        <xs:enumeration value="11" sawsdl:modelReference="#ID_Element.11"/>
        <xs:enumeration value="12" sawsdl:modelReference="#ID_Element.12"/>
        <xs:enumeration value="13" sawsdl:modelReference="#ID_Element.13"/>
        <xs:enumeration value="14" sawsdl:modelReference="#ID_Element.14"/>
        <xs:enumeration value="15" sawsdl:modelReference="#ID_Element.15"/>
        <xs:enumeration value="16" sawsdl:modelReference="#ID_Element.16"/>
        <xs:enumeration value="17" sawsdl:modelReference="#ID_Element.17"/>
        <xs:enumeration value="18" sawsdl:modelReference="#ID_Element.18"/>
        <xs:enumeration value="19" sawsdl:modelReference="#ID_Element.19"/>
        <xs:enumeration value="2" sawsdl:modelReference="#ID_Element.2"/>
    </xs:restriction>

```

```

<xs:enumeration value="20" sawsdl:modelReference="#ID_Element.20"/>
<xs:enumeration value="21" sawsdl:modelReference="#ID_Element.21"/>
<xs:enumeration value="22" sawsdl:modelReference="#ID_Element.22"/>
<xs:enumeration value="23" sawsdl:modelReference="#ID_Element.23"/>
<xs:enumeration value="24" sawsdl:modelReference="#ID_Element.24"/>
<xs:enumeration value="25" sawsdl:modelReference="#ID_Element.25"/>
<xs:enumeration value="26" sawsdl:modelReference="#ID_Element.26"/>
<xs:enumeration value="27" sawsdl:modelReference="#ID_Element.27"/>
<xs:enumeration value="28" sawsdl:modelReference="#ID_Element.28"/>
<xs:enumeration value="29" sawsdl:modelReference="#ID_Element.29"/>
<xs:enumeration value="3" sawsdl:modelReference="#ID_Element.3"/>
<xs:enumeration value="30" sawsdl:modelReference="#ID_Element.30"/>
<xs:enumeration value="31" sawsdl:modelReference="#ID_Element.31"/>
<xs:enumeration value="32" sawsdl:modelReference="#ID_Element.32"/>
<xs:enumeration value="33" sawsdl:modelReference="#ID_Element.33"/>
<xs:enumeration value="34" sawsdl:modelReference="#ID_Element.34"/>
<xs:enumeration value="35" sawsdl:modelReference="#ID_Element.35"/>
<xs:enumeration value="36" sawsdl:modelReference="#ID_Element.36"/>
<xs:enumeration value="37" sawsdl:modelReference="#ID_Element.37"/>
<xs:enumeration value="38" sawsdl:modelReference="#ID_Element.38"/>
<xs:enumeration value="39" sawsdl:modelReference="#ID_Element.39"/>
<xs:enumeration value="4" sawsdl:modelReference="#ID_Element.4"/>
<xs:enumeration value="40" sawsdl:modelReference="#ID_Element.40"/>
<xs:enumeration value="41" sawsdl:modelReference="#ID_Element.41"/>
<xs:enumeration value="42" sawsdl:modelReference="#ID_Element.42"/>
<xs:enumeration value="43" sawsdl:modelReference="#ID_Element.43"/>
<xs:enumeration value="44" sawsdl:modelReference="#ID_Element.44"/>
<xs:enumeration value="45" sawsdl:modelReference="#ID_Element.45"/>
<xs:enumeration value="46" sawsdl:modelReference="#ID_Element.46"/>
<xs:enumeration value="47" sawsdl:modelReference="#ID_Element.47"/>
<xs:enumeration value="48" sawsdl:modelReference="#ID_Element.48"/>
<xs:enumeration value="49" sawsdl:modelReference="#ID_Element.49"/>
<xs:enumeration value="5" sawsdl:modelReference="#ID_Element.5"/>
<xs:enumeration value="50" sawsdl:modelReference="#ID_Element.50"/>
<xs:enumeration value="51" sawsdl:modelReference="#ID_Element.51"/>
<xs:enumeration value="52" sawsdl:modelReference="#ID_Element.52"/>
<xs:enumeration value="53" sawsdl:modelReference="#ID_Element.53"/>
<xs:enumeration value="54" sawsdl:modelReference="#ID_Element.54"/>
<xs:enumeration value="55" sawsdl:modelReference="#ID_Element.55"/>
<xs:enumeration value="6" sawsdl:modelReference="#ID_Element.6"/>
<xs:enumeration value="7" sawsdl:modelReference="#ID_Element.7"/>
<xs:enumeration value="8" sawsdl:modelReference="#ID_Element.8"/>
<xs:enumeration value="9" sawsdl:modelReference="#ID_Element.9"/>
</xs:restriction>
</xs:simpleType>
<xs:simpleType name="ID_Inspector" sawsdl:modelReference="#ID_Inspector">

```

```

        <xs:restriction base="xs:string">
            <xs:enumeration value="1" sawsdl:modelReference="#ID_Inspector.1"/>
            <xs:enumeration value="2" sawsdl:modelReference="#ID_Inspector.2"/>
            <xs:enumeration value="3" sawsdl:modelReference="#ID_Inspector.3"/>
            <xs:enumeration value="4" sawsdl:modelReference="#ID_Inspector.4"/>
            <xs:enumeration value="5" sawsdl:modelReference="#ID_Inspector.5"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="ID_Location" sawsdl:modelReference="#ID_Location">
        <xs:restriction base="xs:string">
            <xs:enumeration value="1" sawsdl:modelReference="#ID_Location.1"/>
            <xs:enumeration value="2" sawsdl:modelReference="#ID_Location.2"/>
            <xs:enumeration value="3" sawsdl:modelReference="#ID_Location.3"/>
            <xs:enumeration value="4" sawsdl:modelReference="#ID_Location.4"/>
            <xs:enumeration value="5" sawsdl:modelReference="#ID_Location.5"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="ID_Material" sawsdl:modelReference="#ID_Material">
        <xs:restriction base="xs:string">
            <xs:enumeration value="1" sawsdl:modelReference="#ID_Material.1"/>
            <xs:enumeration value="2" sawsdl:modelReference="#ID_Material.2"/>
            <xs:enumeration value="3" sawsdl:modelReference="#ID_Material.3"/>
            <xs:enumeration value="4" sawsdl:modelReference="#ID_Material.4"/>
            <xs:enumeration value="99" sawsdl:modelReference="#ID_Material.99"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="ID_Structure_System" sawsdl:modelReference="#ID_Structure_System">
        <xs:restriction base="xs:string">
            <xs:enumeration value="1" sawsdl:modelReference="#ID_Structure_System.1"/>
            <xs:enumeration value="2" sawsdl:modelReference="#ID_Structure_System.2"/>
            <xs:enumeration value="3" sawsdl:modelReference="#ID_Structure_System.3"/>
            <xs:enumeration value="4" sawsdl:modelReference="#ID_Structure_System.4"/>
            <xs:enumeration value="5" sawsdl:modelReference="#ID_Structure_System.5"/>
            <xs:enumeration value="6" sawsdl:modelReference="#ID_Structure_System.6"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="ID_Structure_Type" sawsdl:modelReference="#ID_Structure_Type">
        <xs:restriction base="xs:string">
            <xs:enumeration value="1" sawsdl:modelReference="#ID_Structure_Type.1"/>
            <xs:enumeration value="2" sawsdl:modelReference="#ID_Structure_Type.2"/>
            <xs:enumeration value="3" sawsdl:modelReference="#ID_Structure_Type.3"/>
            <xs:enumeration value="4" sawsdl:modelReference="#ID_Structure_Type.4"/>
            <xs:enumeration value="9" sawsdl:modelReference="#ID_Structure_Type.9"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="ID_Substructure_Type" sawsdl:modelReference="#ID_Substructure_Type">

```



```

        <xs:restriction base="xs:string">
            <xs:enumeration value="1" sawsdl:modelReference="#ID_Substructure_Type.1"/>
            <xs:enumeration value="2" sawsdl:modelReference="#ID_Substructure_Type.2"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="ID_Weather_Type" sawsdl:modelReference="#ID_Weather_Type">
        <xs:restriction base="xs:string">
            <xs:enumeration value="1" sawsdl:modelReference="#ID_Weather_Type.1"/>
            <xs:enumeration value="2" sawsdl:modelReference="#ID_Weather_Type.2"/>
            <xs:enumeration value="3" sawsdl:modelReference="#ID_Weather_Type.3"/>
            <xs:enumeration value="4" sawsdl:modelReference="#ID_Weather_Type.4"/>
            <xs:enumeration value="5" sawsdl:modelReference="#ID_Weather_Type.5"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="Primary_Location" sawsdl:modelReference="#Primary_Location">
        <xs:restriction base="xs:string">
            <xs:enumeration value="1" sawsdl:modelReference="#Primary_Location.1"/>
            <xs:enumeration value="2" sawsdl:modelReference="#Primary_Location.2"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="Responsibility" sawsdl:modelReference="#Responsibility">
        <xs:restriction base="xs:string">
            <xs:enumeration value="1" sawsdl:modelReference="#Responsibility.1"/>
            <xs:enumeration value="2" sawsdl:modelReference="#Responsibility.2"/>
        </xs:restriction>
    </xs:simpleType>
</xs:schema>

```

4.2 XML example

```

<?xml version="1.0" encoding="utf-8"?>
<xml_bms_cim xmlns="http://iec.ch/TC57/xml_bms_cim#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl" xsi:schemaLocation="http://iec.ch/TC57/xml_bms_cim#
schema.xsd" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <BMS_CONDITION_STRUCTURE>
    <Changes>There are no changes since last inspection.</Changes>
    <Condition>Bridge is in perfect condition.</Condition>
    <Remark>New inspection in three years.</Remark>
    <ID_BCI>1</ID_BCI>
  </BMS_CONDITION_STRUCTURE>
  <BMS_INSPECTION>
    <Inspection_Date>2021-03-23</Inspection_Date>
    <Last_Inspection_Date>2019-08-13</Last_Inspection_Date>
    <Remark>Perfect day for inspection :).</Remark>
    <Temperature>18.4</Temperature>
    <ID_Weather_Type>1</ID_Weather_Type>
  </BMS_INSPECTION>

```

```

<BMS_INSPECTORS>
  <ID_Inspector>2</ID_Inspector>
  <Responsibility>1</Responsibility>
</BMS_INSPECTORS>
<BMS_INSPECTORS>
  <ID_Inspector>5</ID_Inspector>
  <Responsibility>2</Responsibility>
</BMS_INSPECTORS>
<BMS_INSPECTORS>
  <ID_Inspector>1</ID_Inspector>
  <Responsibility>2</Responsibility>
</BMS_INSPECTORS>
<BMS_LOCATION_DATA>
  <Road_Number>P2233</Road_Number>
  <Road_Section_Number>1527</Road_Section_Number>
  <Mileage_End>26529</Mileage_End>
  <Mileage_Start>26470</Mileage_Start>
  <X_End>497625.12</X_End>
  <X_Start>497608.80</X_Start>
  <Y_End>4649044.76</Y_End>
  <Y_Start>4649101.80</Y_Start>
  <Geometry_Display>1</Geometry_Display>
  <Primary_Location>2</Primary_Location>
</BMS_LOCATION_DATA>
<BMS_STRUCTURE>
  <Clearance>8.42</Clearance>
  <Crossing_Name>Highway A2</Crossing_Name>
  <Road_Number>A2</Road_Number>
  <Lanes_Num>2</Lanes_Num>
  <Length_Abutments>30.52</Length_Abutments>
  <Limits_Other>Speed limit 50 km/h.</Limits_Other>
  <Name>Bridge name.</Name>
  <Number_Spans>3</Number_Spans>
  <Pavements_Width>6.5</Pavements_Width>
  <Piers_Num>2</Piers_Num>
  <Remark>Remark.</Remark>
  <Skewness>80</Skewness>
  <Structure_Code>0060_6</Structure_Code>
  <TLC_Assesment>45</TLC_Assesment>
  <TLC_Design>40</TLC_Design>
  <Total_Length>34.67</Total_Length>
  <Urban_Area>Skopje</Urban_Area>
  <Width_Sidewalk_L>0.50</Width_Sidewalk_L>
  <Width_Sidewalk_R>0.50</Width_Sidewalk_R>
  <Year_Constr>1996</Year_Constr>
  <ID_Crossing_Type>2</ID_Crossing_Type>

```

```

    <ID_Structure_Type>2</ID_Structure_Type>
  </BMS_STRUCTURE>
  <BMS_STRUCTURE_ELEMENTS>
    <Location_Number>1</Location_Number>
    <Remark>Good.</Remark>
    <ID_ECI>2</ID_ECI>
    <ID_Element>1</ID_Element>
    <ID_Location>2</ID_Location>
    <ID_Material>99</ID_Material>
  </BMS_STRUCTURE_ELEMENTS>
  <BMS_STRUCTURE_ELEMENTS>
    <Location_Number>1</Location_Number>
    <Remark>Good.</Remark>
    <ID_ECI>1</ID_ECI>
    <ID_Element>12</ID_Element>
    <ID_Location>3</ID_Location>
    <ID_Material>1</ID_Material>
  </BMS_STRUCTURE_ELEMENTS>
  <BMS_STRUCTURE_ELEMENTS>
    <Location_Number>2</Location_Number>
    <Remark>Good.</Remark>
    <ID_ECI>1</ID_ECI>
    <ID_Element>12</ID_Element>
    <ID_Location>3</ID_Location>
    <ID_Material>1</ID_Material>
  </BMS_STRUCTURE_ELEMENTS>
  <BMS_STRUCTURE_ELEMENTS>
    <Location_Number>1</Location_Number>
    <Remark>Good.</Remark>
    <ID_ECI>1</ID_ECI>
    <ID_Element>15</ID_Element>
    <ID_Location>4</ID_Location>
    <ID_Material>1</ID_Material>
  </BMS_STRUCTURE_ELEMENTS>
  <BMS_STRUCTURE_ELEMENTS>
    <Location_Number>2</Location_Number>
    <Remark>Good.</Remark>
    <ID_ECI>1</ID_ECI>
    <ID_Element>15</ID_Element>
    <ID_Location>4</ID_Location>
    <ID_Material>1</ID_Material>
  </BMS_STRUCTURE_ELEMENTS>
  <BMS_STRUCTURE_ELEMENTS>
    <Location_Number>1</Location_Number>
    <Remark>Good.</Remark>
    <ID_ECI>2</ID_ECI>

```

```

<ID_Element>2</ID_Element>
<ID_Location>1</ID_Location>
<ID_Material>99</ID_Material>
</BMS_STRUCTURE_ELEMENTS>
<BMS_STRUCTURE_ELEMENTS>
  <Location_Number>1</Location_Number>
  <Remark>Poor.</Remark>
  <ID_ECI>3</ID_ECI>
  <ID_Element>26</ID_Element>
  <ID_Location>1</ID_Location>
  <ID_Material>1</ID_Material>
</BMS_STRUCTURE_ELEMENTS>
<BMS_STRUCTURE_MAINTENANCE>
  <Remark>Minor maintenance.</Remark>
  <Year>2008</Year>
</BMS_STRUCTURE_MAINTENANCE>
<BMS_STRUCTURE_MATERIAL>
  <Primary>1</Primary>
  <Remark>Most of concrete.</Remark>
  <ID_Material>1</ID_Material>
</BMS_STRUCTURE_MATERIAL>
<BMS_STRUCTURE_MATERIAL>
  <Primary>2</Primary>
  <Remark>Remark...</Remark>
  <ID_Material>2</ID_Material>
</BMS_STRUCTURE_MATERIAL>
<BMS_STRUCTURE_PIERS>
  <Height>10.1</Height>
  <Piers_Number>1</Piers_Number>
  <ID_Substructure_Type>2</ID_Substructure_Type>
</BMS_STRUCTURE_PIERS>
<BMS_STRUCTURE_PIERS>
  <Height>11.2</Height>
  <Piers_Number>2</Piers_Number>
  <ID_Substructure_Type>2</ID_Substructure_Type>
</BMS_STRUCTURE_PIERS>
<BMS_STRUCTURE_PIERS>
  <Height>3.5</Height>
  <Piers_Number>1</Piers_Number>
  <ID_Substructure_Type>1</ID_Substructure_Type>
</BMS_STRUCTURE_PIERS>
<BMS_STRUCTURE_PIERS>
  <Height>3.7</Height>
  <Piers_Number>2</Piers_Number>
  <ID_Substructure_Type>1</ID_Substructure_Type>
</BMS_STRUCTURE_PIERS>

```

```
<BMS_STRUCTURE_SPANS>
  <Length>8.6</Length>
  <Span_Number>1</Span_Number>
</BMS_STRUCTURE_SPANS>
<BMS_STRUCTURE_SPANS>
  <Length>9.1</Length>
  <Span_Number>2</Span_Number>
</BMS_STRUCTURE_SPANS>
<BMS_STRUCTURE_SPANS>
  <Length>8.6</Length>
  <Span_Number>3</Span_Number>
</BMS_STRUCTURE_SPANS>
<BMS_STRUCTURE_SYSTEM>
  <Primary>1</Primary>
  <Remark>Remark</Remark>
  <ID_Structure_System>1</ID_Structure_System>
</BMS_STRUCTURE_SYSTEM>
<BMS_STRUCTURE_SYSTEM>
  <Primary>2</Primary>
  <Remark>Remark</Remark>
  <ID_Structure_System>6</ID_Structure_System>
</BMS_STRUCTURE_SYSTEM>
</xml_bms_cim>
```