
**Traffic and Travel Information (TTI) — TTI
via Transport Protocol Experts Group
(TPEG) Extensible Markup Language
(XML) —**

Part 3:
tpeg-rtmML

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*Informations sur le trafic et le tourisme (TTI) — Messages TTI via le
langage de balisage extensible (XML) du groupe d'experts du protocole
de transport (TPEG) —*

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Partie 3: tpeg-rtmML



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years with a view to deciding whether it should be confirmed for a further three years, revised to become an International Standard, or withdrawn. In the case of a confirmed ISO/PAS or ISO/TS, it is reviewed again after six years at which time it has to be either transposed into an International Standard or withdrawn.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TS 24530-3 was prepared by the European Committee for Standardization (CEN) in collaboration with Technical Committee ISO/TC 204, *Intelligent transport systems*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this document, read "...this European pre-Standard..." to mean "...this Technical Specification...".

ISO/TS 24530 consists of the following parts, under the general title *Traffic and Travel Information (TTI) — TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML)*:

- *Part 1: Introduction, common data types and tpegML*
- *Part 2: tpeg-locML*
- *Part 3: tpeg-rtmML*
- *Part 4: tpeg-ptiML*

Introduction

TPEG in XML (tpegML) provides the solution to diverse requirements for the ultimate delivery of TPEG applications (potentially simultaneously) via for example ARIB, ATSC, DAB, DVB and the Internet. This will solve the minimal adaptation layers requirement and without doubling up on message carousels, which are handled at different layers of the protocol stacks.

The original TPEG technology uses a byte-oriented stream format, which may be carried on almost any digital bearer with an appropriate adaptation layer. TPEG messages are delivered from service providers to end-users, and are used to transfer application data from the database of a service provider to an end-user's equipment.

TPEG binary was initially designed to meet a particular brief, from the EBU's Broadcast Management Committee; to develop a new protocol for Traffic and Travel Information, for use in the multimedia broadcasting environment. TPEG applications were developed with service and transport features, which enable travel-related messages to be coded, decoded, filtered and understood both by humans (visually and/or audibly) and by agent systems. This brief was also endorsed by the EBU TTI Broadcast Strategy Team, who recognized the vital importance of a bearer independent TTI protocol.

The development of TPEG binary technology is excellently matched both technically and economically to DAB and possibly to internet bearers, where of the order of up to 10 kbits/s is considered acceptable. However other bearers such as ARIB, ATSC and DVB may be able to offer much higher data rates with economic and technical utility. Nevertheless these bearers are highly structured (layered) in their ability to handle transparent data services and they include mechanisms suitable for carousel delivery, which would require a considerably different TPEG data structure before real transparency could be achieved.

Another potential use of tpegML is provided to Service Providers who would have a standardised message generation interface, yet be able to develop systems suited to their own requirements. This will enable Service Providers to exchange pre-edited information regardless of their message generation systems and be substantially language independent.

tpegML has been developed using the DTD approach, which allows the use of different language entity files to easily provide a truly language independent service. This approach has the advantage that tpegML files can be rendered in any language, provided the language entity file is available to the internet browser. This document provides English language entity files only. For other languages the entity files in this document only require direct translation.

The development of this ISO/TS 24530 series was undertaken jointly with European Broadcasting Union B/TPEG Group, which has evolved into the TPEG Forum Standards Task Force. Attention is drawn to the EBU sponsored TPEG Forum development principles, which require all inputs containing IPR to be declared during drafting work. No such declarations have been made.

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Traffic and Travel Information (TTI) — TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) —

Part 3: tpeg-rtmML

1 Scope

This document establishes the XML encoding of the method of the Road Traffic Message application.

The TPEG-RTM Application is intended to convey information to road users. The information provided relates to event and some status information on the road network and on associated infrastructure affecting a road journey. For example, limited information about abnormal operation of links in the network may be included, such as ferries, lifting-bridges, etc.

The TPEG-RTM Application has the broad objective to allow the generation of Traffic and Travel Information (TTI) messages, for delivery to the end-user by one or more bearers. A hierarchical methodology has been developed to allow the creation of messages from a set of TPEG-RTM tables, which are essentially word-oriented and cover most needs.

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These TPEG-RTM tables (essentially word-oriented data object dictionaries) comprise a wide ranging ability to describe a TTI event and some status information, introducing new precision in a number of areas such as "Vehicle types", "Positional information on the carriageway" and "Diversion routing advice".

It is vital, for further understanding of this document, to have more than a passing understanding of the TPEG-RTM binary specification which describes, among other things, in a step-by step approach: Message Management, Level One Classes and how they are structured, hierarchically to provide a full Road Traffic Message together with the TPEG Location Referencing system.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/TS 24530-1, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) — Part 1: Introduction, common data types and tpegML*

ISO/TS 18234-1, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams — Part 1: Introduction, Numbering and Versions*

ISO/TS 18234-2, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams — Part 2: Syntax, Semantics and Framing Structure (SSF)*

ISO/TS 18234-4, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams — Part 4: Road Traffic Message (RTM) application*

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ISO/TS 18234-6, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams — Part 6: Location Referencing for applications*

ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*

ISO 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*

3 Abbreviated terms

For the purposes of this document, the following abbreviations apply.

3.1

ARIB

Association of Radio Industries and Business (Japan)

3.2

ATSC

American Television Standards Committee (USA)

3.3

DAB

Digital Audio Broadcasting

3.4

DTD/dtd

Document Type Definition - lower case used for file naming

3.5

DVB

Digital Video Broadcasting

3.6

EBU

European Broadcasting Union

3.7

IPR

Intellectual Property Right(s)

3.8

RTM

Road Traffic Message

3.9

TPEG

Transport Protocol Experts Group

3.10

tpegML

tpeg XML applications - use lower case to distinguish them from the TPEG binary applications which use upper case

3.11

tpeg-loc

location referencing for applications

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3.12**TTI**

Traffic and Travel Information

3.13**WGS84**

World Geodetic System 1984

3.14**XML**

Extensible Markup Language

4 Format of this document

This document is divided into Sections, each describes an XML element used in tpegML. Each element has an introduction explaining what it is for, the DTD definition relevant to it, guidelines “extending” the DTD and an example. The complete .dtd and .ent files are contained in Annexes A and B.

4.1 Tables

A large number of attributes used in elements in tpegML are based on tables in the TPEG specifications. To encode this in XML there are defined general entity references for all the table entries. In this Technical Specification series these entities are taken from the TPEG tables defined in the equivalent part of ISO/TS 18234.

For display in other languages these entity files only need to be replaced by directly translated equivalents.

These are named, for example `rtmX_Y`, where X is the table number and Y is the row number (e.g. “`rtm01_01`” is the entry in the RTM vehicle_type table for car). The DTD does not restrict the entity references that can be used in an attribute so the guidelines sections indicate which entities/tables should be used for which attributes.

Table numbers use a leading zero below 10, whereas the row number within a table does not use a leading zero. Table numbers are random and entries within a table are random – no priority order is implied.

4.2 Example XML

This example shows the following message: “An accident closes A12 at Brentwood, Essex” expressed as a single tpegML message using elements from tpeg-locML and tpeg-rtmML.

```
<tpeg_message>
  <originator country="UK" originator_name="BBC Travel"/>
  <summary xml:lang="en">Accident closes A12 at Brentwood, Essex</summary>
  <road_traffic_message message_id="123"
    version_number="1"
    message_generation_time="2002-04-03T13:03:00Z"
    severity_factor="&rtm31_4;">

    <!-- Location is on A12 in Brentford, Essex -->
    <location_container language="&loc41_30;">
      <location_coordinates location_type="&loc01_5;">
        <location_point>
          <WGS84 longitude="-0.1337" latitude="51.52641"/>
          <location_descriptor descriptor_type="&loc03_7;" descriptor="A12"/>
          <location_descriptor descriptor_type="&loc03_8;" descriptor="A128"/>
          <location_descriptor descriptor_type="&loc03_24;" descriptor="Brentwood"/>
          <location_descriptor descriptor_type="&loc03_25;" descriptor="Essex"/>
        </location_point>
        <direction direction_type="&loc02_2;">
      </location_coordinates>
    </location_container>
```

```

<!-- Accident in thick fog involving 50 vehicles -->
<accidents number_of="1">
  <position position="&rtm10_37;" />
  <vehicles number_of="50">
    <vehicle_problem vehicle_problem="&rtm03_22;" />
  </vehicles>
</accidents>
<visibility>
  <obscurity obscurity_problem="&rtm17_2;" visibility_distance="20" />
</visibility>
<network_conditions>
  <position position="&rtm10_37;" />
  <restriction restriction="&rtm49_1;" />
</network_conditions>

</road_traffic_message>
</tpeg_message>

```

This example shows the following message: *“Temporary traffic lights on A811 at Drymen”*.

```

<tpeg_message>
  <originator country="UK" originator_name="BBC Travel" />
  <summary xml:lang="en">Temporary traffic lights on A811 at Drymen</summary>
  <road_traffic_message message_id="124"
    version_number="1"
    message_generation_time="2002-04-03T13:40:00Z"
    severity_factor="&rtm31_2;">

    <!-- Location is A811 at Drymen -->
    <location_container language="&loc41_30;">
      <location_coordinates location_type="&loc01_6;">
        <location_point>
          <WGS84 longitude="-4.45451" latitude="56.05573" />
          < location_descriptor descriptor_type="&loc03_7;" descriptor="A811" />
          < location_descriptor descriptor_type="&loc03_8;" descriptor="A809" />
          < location_descriptor descriptor_type="&loc03_24;" descriptor="Dumbarton" />
          < location_descriptor descriptor_type="&loc03_24;" descriptor="Stirling" />
        </location_point>
      </location_coordinates>
    </location_container>

    <!-- Temporary traffic lights -->
    <facilities_performance>
      <traffic_control traffic_control_type="&rtm42_11;" traffic_control_status="&rtm43_12;">
        <position position="&rtm10_37;" />
      </traffic_control>
    </facilities_performance>

  </road_traffic_message>
</tpeg_message>

```

This example shows the following message: *“Collision of a motor bike and a large car in Munich right in front of the IBIS hotel on Ungerer Straße between the junctions with Fröttmaninger Straße (E11.60028°/N48.17583°) and Schenkendorfstraße/Isar- ring (E11.59722°/N48.17306°) on wet road (all lanes).”*



```
<tppeg_message>
  <originator country="DE"/>
  <summary xml:lang="en">Collision of a motor bike and a large car in Munich right in front of the IBIS hotel on Ungerer Straße
between the junctions with Fröttmaninger Straße (E11.60028°/N48.17583°) and Schenkendorfstraße/Isar- ring (E11.59722°/N48.17306°)
on wet road (all lanes).</summary>
```

```
<summary xml:lang="de">Unfall zwischen Motorrad und grossem Auto in München in Höhe des IBIS Hotel in der Ungerer
Straße zwischen den Kreuzungen mit Fröttmaninger Straße (E11.60028°/N48.17583°) und Schenkendorfstraße/Isar- ring
(E11.59722°/N48.17306°) auf nasser Straße (alle Spuren).</summary>
```

```
<road_traffic_message message_id="7"
  version_number="25"
  message_expiry_time="2000-09-30T12:05:00Z"
  severity_factor="&rtm31_5;">
  <location_container language="&loc41_40;">
    <location_coordinates location_type="&loc01_3;">
      <location_point>
        <WGS84 longitude="1160028" latitude="4817583"/>
        <location_descriptor descriptor_type="&loc03_7;" descriptor="B11;Ungerer Straße"/>
        <location_descriptor descriptor_type="&loc03_8;" descriptor="Fröttmaninger Straße"/>
      </location_point>
      <location_point>
        <WGS84 longitude="1159722" latitude="4817306"/>
        <location_descriptor descriptor_type="&loc03_7;" descriptor="B11;Ungerer Straße"/>
        <location_descriptor descriptor_type="&loc03_8;" descriptor="B2R;Schenkendorfstraße"/>
        <location_descriptor descriptor_type="&loc03_9;" descriptor="B2R;Isarring"/>
      </location_point>
    </location_coordinates>
  </location_container>
  <accidents number_of="1">
    <position position="&rtm10_9;"/>
    <vehicles number_of="2">
      <position position="&rtm10_9;"/>
      <vehicle_info vehicle_type="&rtm01_19;" vehicle_subtype="&rtm48_3;"/>
      <vehicle_info vehicle_type="&rtm01_1;" vehicle_subtype="&rtm07_3;"/>
    </vehicles>
  </accidents>
  <road_conditions>
    <position position="&rtm10_37;"/>
    <surface general_magnitude="&rtm31_4;" surface_condition="&rtm18_9;"/>
    <adhesion general_magnitude="&rtm31_4;" adhesion_condition="&rtm39_18;"/>
  </road_conditions>
```

```
</road_traffic_message>
</tppeg_message>
```

5 tpeg-rtmML

These are defined fully in the tpeg-rtmML.dtd and tpeg-rtmML.ent files (see Annexes A and B).

5.1 road_traffic_message

```

<!-- rtm_table 31: general magnitude -->
<!ENTITY rtm31_0 "unknown">
<!ENTITY rtm31_1 "very slight">
<!ENTITY rtm31_2 "slight">
<!ENTITY rtm31_3 "medium">
<!ENTITY rtm31_4 "severe">
<!ENTITY rtm31_5 "very severe">
<!ENTITY rtm31_255 "unspecified">

<!-- rtm_table 46: unverified information -->
<!ENTITY rtm46_0 "unknown">
<!ENTITY rtm46_1 "unverified">
<!ENTITY rtm46_255 "verified">

<!ELEMENT road_traffic_message ((repetitive_time | non_repetitive_time | location_container | accidents | obstructions |
activities | road_conditions | network_performance | network_conditions | facilities_performance | moving_hazard |
security_alert | public_transport_info | visibility | weather | diversion_advice)*)>
<!ATTLIST road_traffic_message
  message_id CDATA #REQUIRED
  version_number CDATA #REQUIRED
  message_generation_time %time; #IMPLIED
  start_time %time; #IMPLIED
  stop_time %time; #IMPLIED
  message_expiry_time %time; #IMPLIED
  severity_factor CDATA #IMPLIED
  unverified_information CDATA #IMPLIED
>

```

road_traffic_message: This represents a road traffic message (RTM) from TPEG-RTM. An RTM is intended to convey information to road users. The information provided relates to even and some status information on the road network and on the associated infrastructure affecting a road journey. RTMs have a hierarchical structure that allows the creation of messages from a set of RTM tables, which are essentially word-oriented and cover most needs.

The `severity_factor` attribute shall use entity references of the form `rtm31_x`. The `unverified_information` attribute shall use entity references of the form `rtm46_x`.

Example:

```

<road_traffic_message message_id="234" version_number="4"
  message_generation_time="2001-02-12T12:01:13Z"
  start_time="2001-02-12T15:00:00Z"
  stop_time="2001-02-12T15:30:00Z"
  message_expiry_time="2001-02-12T15:45:00Z"
  severity_factor="&rtm31_2;"
  unverified_information="&rtm46_1;">

  <location_container>...</location_container>
  <accidents>...</accidents>

</road_traffic_message>

```

5.2 repetitive_time

```

<!ELEMENT repetitive_time EMPTY>
<!ATTLIST repetitive_time
  hour %intunti; #REQUIRED
  minute %intunti; #REQUIRED
  duration %intunli; #REQUIRED
  day_mask %day_mask; #REQUIRED
>

```

repetitive_time: This describes a repetitive time that applies to the current message. The repetitive time information is bounded by the message start and stop time. The duration attribute shall describe the duration in minutes from 0 to 10079 (one week).

Example:

```
<repetitive_time hour="0" minute="0" duration="15" day_mask="0x05"/>
```

5.3 non_repetitive_time

```
<!ELEMENT non_repetitive_time (non_rep_time*)>
```

non_repetitive_time: This describes a set of operating times that are non-repetitive.

5.3.1 non_rep_time

```
<!ELEMENT non_rep_time EMPTY>
<!ATTLIST non_rep_time
  start_time %time; #REQUIRED
  duration %intunlo; #REQUIRED
>
```

non_rep_time: This describes one of the operating times in a **non_repetitive_time** element. The duration attribute shall be in seconds, 0 represents a start time without a duration.

Example:

```
<non_repetitive_time>
  <non_rep_time start_time="2002-02-18 T14:00:00Z" duration="3600"/>
  <non_rep_time start_time="2002-02-19 T14:00:00Z" duration="3600"/>
</non_repetitive_time>
```

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5.4 accident

```
<!ELEMENT accidents ((position | animals | vehicles | people)*)>
<!ATTLIST accidents
  number_of %intunti; #REQUIRED
>
```

accident: This describes situations in which road users (vehicles, animals and people) do not behave in a predictable or safe manner and either impact with each other or the roadside infrastructure and in some cases may leave the road.

It contains **position**, **animals**, **vehicles** and **people** sub-elements that give information on the position of the accident, what was involved and what happened.

Example:

```
<accidents number_of="1">
  <position/>
  <animals>...</animals>
  <vehicles>...</vehicles>
  <people>...</people>
</accidents>
```

5.4.1 position

```

<!-- rtm_table 10: position -->
<!ENTITY rtm10_0 "unknown">
<!ENTITY rtm10_1 "driving lane 1">
<!ENTITY rtm10_2 "driving lane 2">
<!ENTITY rtm10_3 "driving lane 3">
<!ENTITY rtm10_4 "driving lane 4">
<!ENTITY rtm10_5 "driving lane 5">
<!ENTITY rtm10_6 "driving lane 6">
<!ENTITY rtm10_7 "driving lane 7">
<!ENTITY rtm10_8 "driving lane 8">
<!ENTITY rtm10_9 "driving lanes 1 and 2">
<!ENTITY rtm10_10 "driving lanes 2 and 3">
<!ENTITY rtm10_11 "driving lanes 3 and 4">
<!ENTITY rtm10_12 "driving lanes 4 and 5">
<!ENTITY rtm10_13 "driving lanes 5 and 6">
<!ENTITY rtm10_14 "driving lanes 6 and 7">
<!ENTITY rtm10_15 "driving lanes 7 and 8">
<!ENTITY rtm10_16 "driving lanes 1, 2 and 3">
<!ENTITY rtm10_17 "driving lanes 2, 3 and 4">
<!ENTITY rtm10_18 "driving lanes 3, 4 and 5">
<!ENTITY rtm10_19 "driving lanes 4, 5 and 6">
<!ENTITY rtm10_20 "driving lanes 5, 6 and 7">
<!ENTITY rtm10_21 "driving lanes 6, 7 and 8">
<!ENTITY rtm10_22 "driving lanes 1, 2, 3 and 4">
<!ENTITY rtm10_23 "driving lanes 2, 3, 4 and 5">
<!ENTITY rtm10_24 "driving lanes 3, 4, 5 and 6">
<!ENTITY rtm10_25 "driving lanes 4, 5, 6 and 7">
<!ENTITY rtm10_26 "driving lanes 5, 6, 7 and 8">
<!ENTITY rtm10_27 "driving lanes 1, 2, 3, 4 and 5">
<!ENTITY rtm10_28 "driving lanes 2, 3, 4, 5 and 6">
<!ENTITY rtm10_29 "driving lanes 3, 4, 5, 6 and 7">
<!ENTITY rtm10_30 "driving lanes 4, 5, 6, 7 and 8">
<!ENTITY rtm10_31 "driving lanes 1, 2, 3, 4, 5 and 6">
<!ENTITY rtm10_32 "driving lanes 2, 3, 4, 5, 6 and 7">
<!ENTITY rtm10_33 "driving lanes 3, 4, 5, 6, 7 and 8">
<!ENTITY rtm10_34 "driving lanes 1, 2, 3, 4, 5, 6 and 7">
<!ENTITY rtm10_35 "driving lanes 2, 3, 4, 5, 6, 7 and 8">
<!ENTITY rtm10_36 "off-road">
<!ENTITY rtm10_37 "all driving lanes">
<!ENTITY rtm10_38 "central reservation">
<!ENTITY rtm10_39 "hard shoulder">
<!ENTITY rtm10_40 "service road">
<!ENTITY rtm10_41 "local lane">
<!ENTITY rtm10_42 "underpass">
<!ENTITY rtm10_43 "fly over">
<!ENTITY rtm10_44 "emergency lane">
<!ENTITY rtm10_45 "bridge">
<!ENTITY rtm10_46 "tunnel">
<!ENTITY rtm10_47 "overtaking lane">
<!ENTITY rtm10_48 "turning lane">
<!ENTITY rtm10_49 "slip road">
<!ENTITY rtm10_50 "toll plaza">
<!ENTITY rtm10_51 "cycle lane">
<!ENTITY rtm10_52 "through traffic lane">
<!ENTITY rtm10_53 "filter lane">
<!ENTITY rtm10_54 "bend">
<!ENTITY rtm10_55 "hilltop">
<!ENTITY rtm10_56 "car pool lane">
<!ENTITY rtm10_57 "bus lane">
<!ENTITY rtm10_58 "slow vehicle lane">
<!ENTITY rtm10_59 "verges">
<!ENTITY rtm10_60 "roadside bank">
<!ENTITY rtm10_61 "adjacent to road">
<!ENTITY rtm10_62 "opposite carriageway">
<!ENTITY rtm10_63 "exit slip road">
<!ENTITY rtm10_64 "entry slip road">
<!ENTITY rtm10_65 "express lane">
<!ENTITY rtm10_66 "lay-by">
<!ENTITY rtm10_67 "rest area">
<!ENTITY rtm10_68 "service area">
<!ENTITY rtm10_69 "around corner">
<!ENTITY rtm10_70 "escape lane">
<!ENTITY rtm10_71 "feeder road">

```

```

<!ENTITY rtm10_72 "left-hand feeder road">
<!ENTITY rtm10_73 "right-hand feeder road">
<!ENTITY rtm10_74 "dyke">
<!ENTITY rtm10_75 "shaded area">
<!ENTITY rtm10_76 "sunny area">
<!ENTITY rtm10_77 "left-hand turn lane">
<!ENTITY rtm10_78 "right-hand turn lane">
<!ENTITY rtm10_79 "bus stop">
<!ENTITY rtm10_80 "set down area">
<!ENTITY rtm10_81 "low lying area">
<!ENTITY rtm10_82 "low altitude route">
<!ENTITY rtm10_83 "high altitude route">
<!ENTITY rtm10_84 "ascending route">
<!ENTITY rtm10_85 "descending route">
<!ENTITY rtm10_86 "around the bend">
<!ENTITY rtm10_87 "weigh station">
<!ENTITY rtm10_88 "north bound carriageway">
<!ENTITY rtm10_89 "north-east bound carriageway">
<!ENTITY rtm10_90 "east bound carriageway">
<!ENTITY rtm10_91 "south-east bound carriageway">
<!ENTITY rtm10_92 "south bound carriageway">
<!ENTITY rtm10_93 "south-west bound carriageway">
<!ENTITY rtm10_94 "west-bound carriageway">
<!ENTITY rtm10_95 "north-west bound carriageway">
<!ENTITY rtm10_96 "clockwise carriageway">
<!ENTITY rtm10_97 "anti-clockwise carriageway">
<!ENTITY rtm10_98 "junction">
<!ENTITY rtm10_99 "left lane">
<!ENTITY rtm10_100 "left lane">
<!ENTITY rtm10_101 "right lane">
<!ENTITY rtm10_102 "right lane">
<!ENTITY rtm10_103 "middle lane">
<!ENTITY rtm10_104 "one lane">
<!ENTITY rtm10_105 "two lanes">
<!ENTITY rtm10_106 "three lanes">
<!ENTITY rtm10_255 "on route">

<!ELEMENT position EMPTY>
<!ATTLIST position
  position CDATA #REQUIRED
>

```

<https://standards.iteh.ai/catalog/standards/sist/bbbc331b-9a62-462a-b64f-dee50fe0854e/iso-ts-24530-3-2006>
 ISO/TS 24530-3:2006
 (standards.iteh.ai)

position: This represents the position on the carriageway where the hazard occurs. The position attribute shall use entity references of the form `rtm10_x`.

Example:

```
<position position="&rtm10_10;" />
```

5.4.2 animals

```

<!ELEMENT animals ((position | animal_problem | animal_info)*)>
<!ATTLIST animals
  number_of %numag; #REQUIRED
>

```

animals: This represents information about animals. It contains `position`, `animal_problem`, and `animal_info` sub-elements that give information on the position of the animals, the type of gathering and the type of animals.

Example:

```

<animals number_of="10000">
  <position/>
  <animal_problem>...</animal_problem>
  <animal_info>...</animal_info>
</animals>

```