

DDA - Det Digitale Anlæg

Workgroup 1

Simple Data Exchange, LandXML Surface

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Purpose

The purpose of this small exercise is to evaluate what is happening to a surface when transferred between different systems using the LandXML format. It is not an in-depth analysis of all possible combinations of data, but only a very simple test to see if interpretation of data is correct. There were no special definitions and setup done in the software prior to the LandXML export/import, and no expertise required to do the testing.

The software tested include:

- PowerCivil for Denmark, V8i SELECTseries 2 (Bentley)
- MX, V8i SELECTseries 2 (Bentley)
- Civil 3D, V 2012 (Autodesk)
- Novapoint v 18.20 (Vianova)
- InRoads v8i SELECTseries 2 (Bentley)

The test was using following procedure:

- 1) Creation of basis data for a small basin
- 2) Export of surface data (basin) to LandXML format, Version 1.0
- 3) Import of the LandXML basis data in the applications tested
- 4) From the imported data a triangle model is created
- 5) From the imported data contours at 10cm interval is created
- 6) The imported data is exported to LandXML
- 7) Compare the "returned" XML-data, triangle models and contours with the "original"

The results can form basis for pointing out errors and incompatibilities, and hopefully help the software vendors getting a more common understanding of the problems found when using LandXML to transfer surface data between different systems.

Conclusion

Main conclusion:

- Most software products interpret the LandXML data in a way that make the data usable without serious errors.
- None of the software products tested are using the triangle information included in the LandXML data. All products did a re-triangulation after import from LandXML – even the triangle information is included in the LandXML data.
-

MX:

- does not honor the "Contour" feature
- does not honor the "Interior" (undefined area, hole) feature style
- Triangles created are incorrect.
- Contours created are incorrect.

Civil 3D

- re-triangulated triangles very similar to the original
- Contours created are correct.

Novapoint

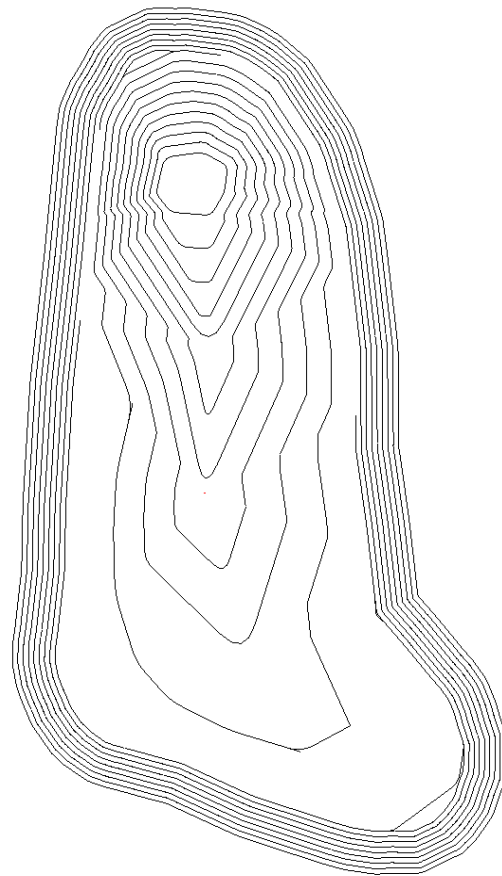
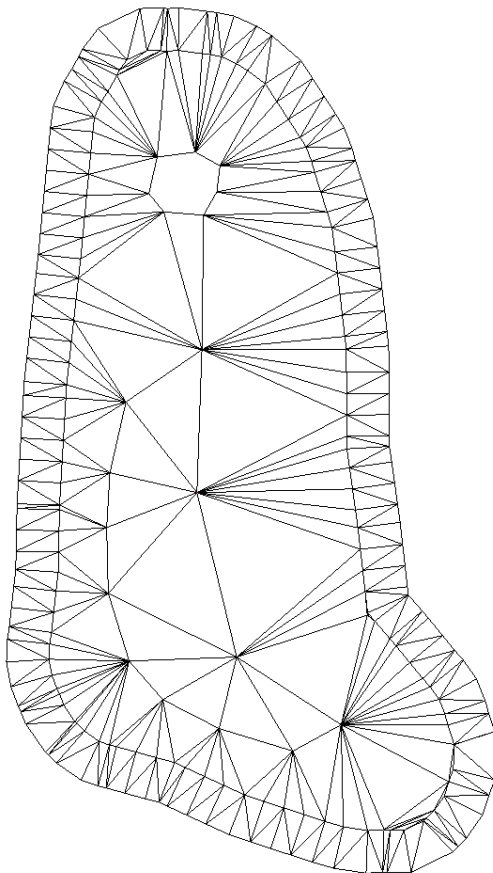
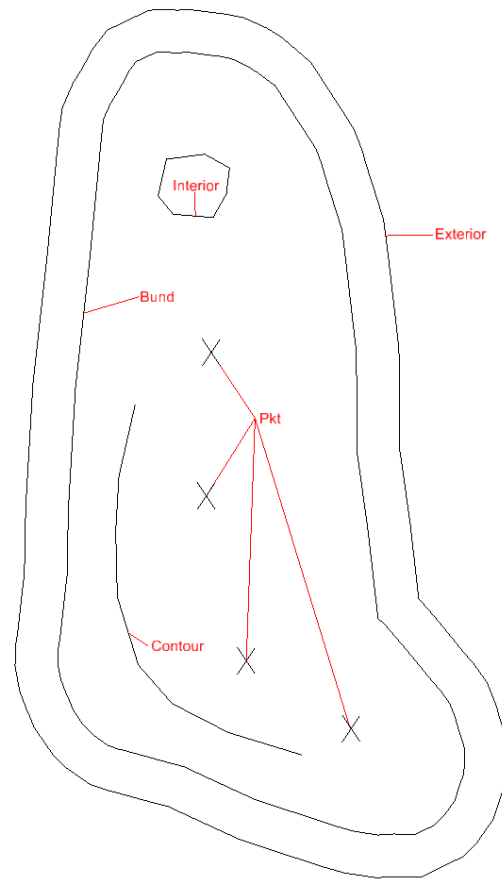
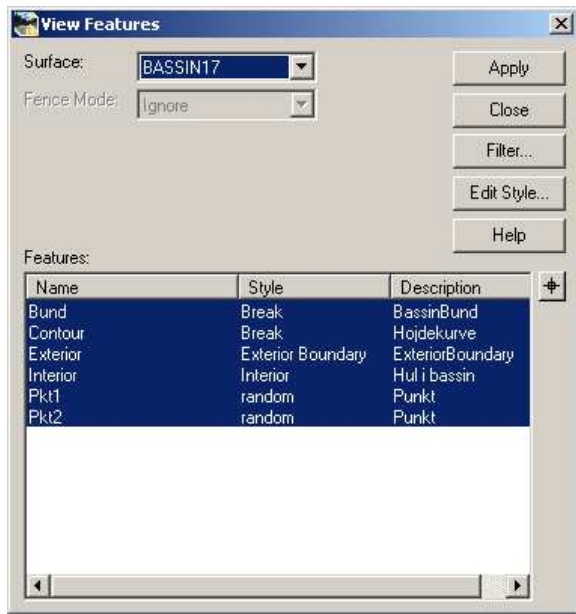
- does not honor the "Interior" (undefined area, hole) feature style
- re-triangulated triangles very similar to the original (except for the "hole")
- Contours created are correct (except for the "hole")

InRoads

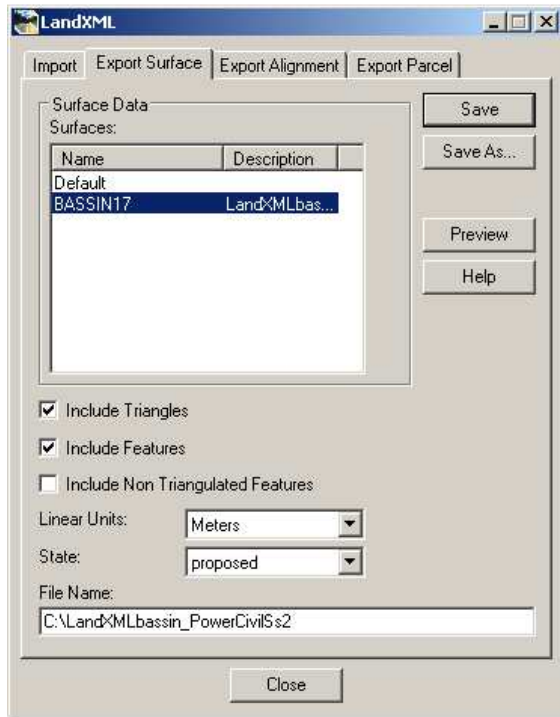
- re-triangulated triangles differ from the original.
- Contours created are correct.

Basis, LandXML basin

Basin, Features



Export from PowerCivil Ss2 to LandXML



Extract of LandXML file

```
<?xml version="1.0" encoding="iso-8859-1" ?>
<LandXML xmlns="http://www.landxml.org/schema/LandXML-1.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.landxml.org/schema/LandXML-1.0 http://www.landxml.org/schema/landxml-1.0/LandXML-1.0.xsd" version="1.0"
date="2012-09-07" time="03:14:56">
<Units>
  <Metric areaUnit="squareMeter" linearUnit="meter" volumeUnit="cubicMeter" temperatureUnit="celsius" pressureUnit="HPA"/>
</Units>
<Application name="PowerCivil for Denmark V8i (SELECTseries 2)" manufacturer="Bentley Systems, Inc." version="08.11.07.494"
manufacturerURL="www.bentley.com"/>
<Surfaces>
  <Surface name="BASSIN17" desc="LandXMLbassin" state="proposed">
    <SourceData>
      <Boundaries>
        <Boundary bndType="void" edgeTrim="true" name="Interior" desc="Hul i bassin">
          <PntList3D>
            6186670.165645 203739.579710 87.000000 6186669.697632 203735.993045 87.000000 6186666.265542 203735.213336 87.000000
            6186664.549496 203736.616813 87.000000 6186664.237488 203740.359420 87.000000 6186666.421546 203741.606955 87.000000 6186668.876616
            203741.901229 87.000000 6186670.165645 203739.579710 87.000000
          </PntList3D>
          <Feature code="Boundary">
            <Property label="guid" value="a46d90c3-07a7-4d23-b57d-74528f425193"/>
            <Property label="style" value="Interior"/>
            <Property label="triangulate" value="true"/>
            <Property label="pointDensity" value="0.000000"/>
          </Feature>
        </Boundary>
        <Boundary bndType="outer" edgeTrim="true" name="Exterior" desc="ExteriorBoundary">
          <PntList3D>
            6186670.453281 203725.761804 88.800000 6186668.462191 203725.571595 88.800000 6186666.471102 203725.381387 88.800000
            .....
            6186672.444370 203725.952012 88.800000 6186670.453281 203725.761804 88.800000
          </PntList3D>
          <Feature code="Boundary">
            <Property label="guid" value="aa711e19-b6a1-4b52-a632-5915fd1c630b"/>
            <Property label="style" value="Exterior Boundary"/>
            <Property label="triangulate" value="true"/>
            <Property label="pointDensity" value="0.000000"/>
          </Feature>
        </Boundary>
      </Boundaries>
      <Breaklines>
```

```

<Breakline brkType="standard" name="Bund" desc="BassinBund">
<PntList3D>
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.....
  203725.809824 88.000000 6186623.970943 203725.881954 88.000000
</PntList3D>
<Feature code="Breakline">
  <Property label="guid" value="5b4202d3-359f-4ee1-b91f-819864253a69"/>
  <Property label="style" value="Break"/>
  <Property label="triangulate" value="true"/>
  <Property label="pointDensity" value="0.000000"/>
</Feature>
</Breakline>
</Breaklines>
<Contours>
<Contour elev="87.9000000">
  <PntList2D>
    6186646.694239 203733.057152 6186640.046646 203731.546941 6186634.909870 203731.244899 6186628.715522 203731.395920
1866622.370092 203733.359194 6186618.744132 203736.530636 6186616.024662 203741.816374 6186613.909519 203748.763343
  </PntList2D>
  <Feature code="Contour">
    <Property label="guid" value="a5bd3ccc-6cd4-4b4d-b5c9-e19977ee30af"/>
    <Property label="style" value="Break"/>
    <Property label="triangulate" value="true"/>
    <Property label="pointDensity" value="0.000000"/>
  </Feature>
</Contour>
</Contours>
<DataPoints name="Pkt2" desc="Punkt" DTMAtribute="spot">
<PntList3D>
  6186622.740391 203743.478258 87.800000 6186638.184799 203739.735652 87.600000 6186651.601154 203740.203478 87.400000
</PntList3D>
<Feature code="DataPoints">
  <Property label="guid" value="38ada1c6-8782-4f39-96cf-9e75499931b6"/>
  <Property label="style" value="random"/>
  <Property label="triangulate" value="true"/>
  <Property label="pointDensity" value="0.000000"/>
</Feature>
</DataPoints>
<DataPoints name="Pkt1" desc="Punkt" DTMAtribute="spot">
<PntList3D>
  6186616.387505 203753.301616 87.899627
</PntList3D>
<Feature code="DataPoints">
  <Property label="guid" value="ac3dddf0-a82f-4f1a-bb91-041df021f527"/>
  <Property label="style" value="random"/>
  <Property label="triangulate" value="true"/>
  <Property label="pointDensity" value="0.000000"/>
</Feature>
</DataPoints>
</SourceData>
<Definition surfType="TIN">
<Pnts>
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  </P>
  <P id="2">
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  </P>
  <P id="3">
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  </P>
  <P id="4">
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  </P>
.....
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  </P>
  <P id="250">
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  </P>
  <P id="251">
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  </P>
  <P id="252">
    6186616.024662 203741.816374 87.900000
  </P>
  <P id="253">
    6186613.909519 203748.763343 87.900000
  </P>
</Pnts>
</Faces>

```

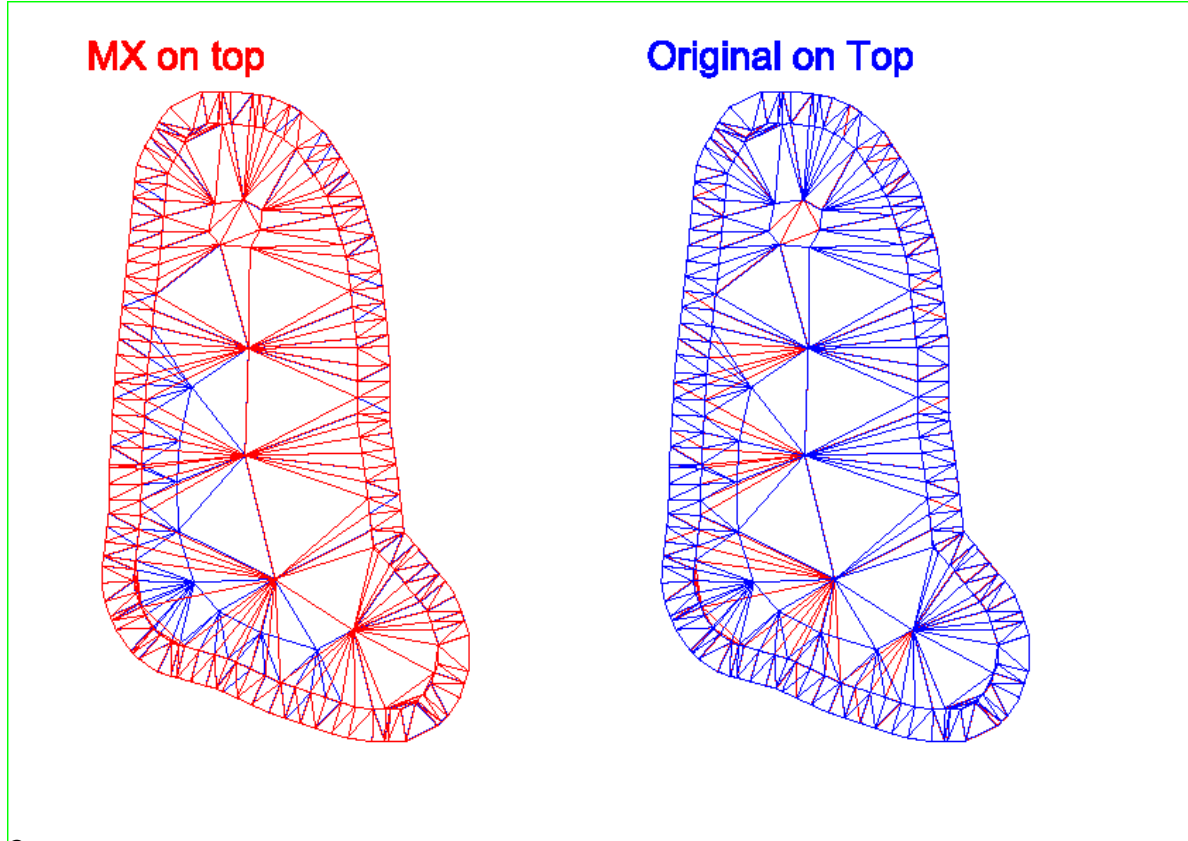
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<F>
  11 150 12
</F>
<F>
  55 220 56
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  13 147 14
</F>
<F>
  180 98 181
</F>
.....
.....
.....
<F>
  248 2 249
</F>
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  247 2 248
</F>
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  246 3 2
</F>
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  127 3 126
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<F>
  253 4 100
</F>
<F>
  82 4 81
</F>
</Faces>
</Definition>
<Feature code="Surface">
  <Property label="pref" value="Design"/>
  <Property label="guid" value="8f973a6c-4366-44c7-adb9-94452605d7ce"/>
</Feature>
</Surface>
</Surfaces>
</LandXML>

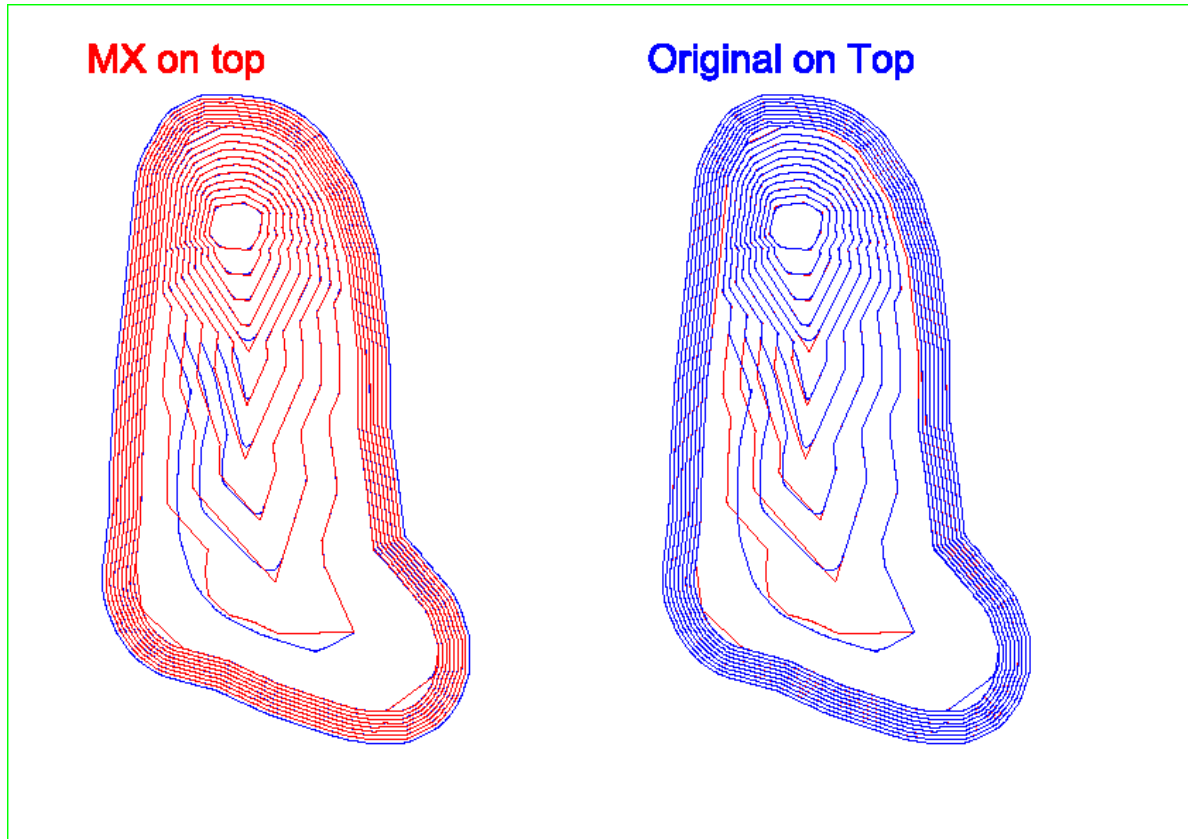
```


MX

Triangles, compare

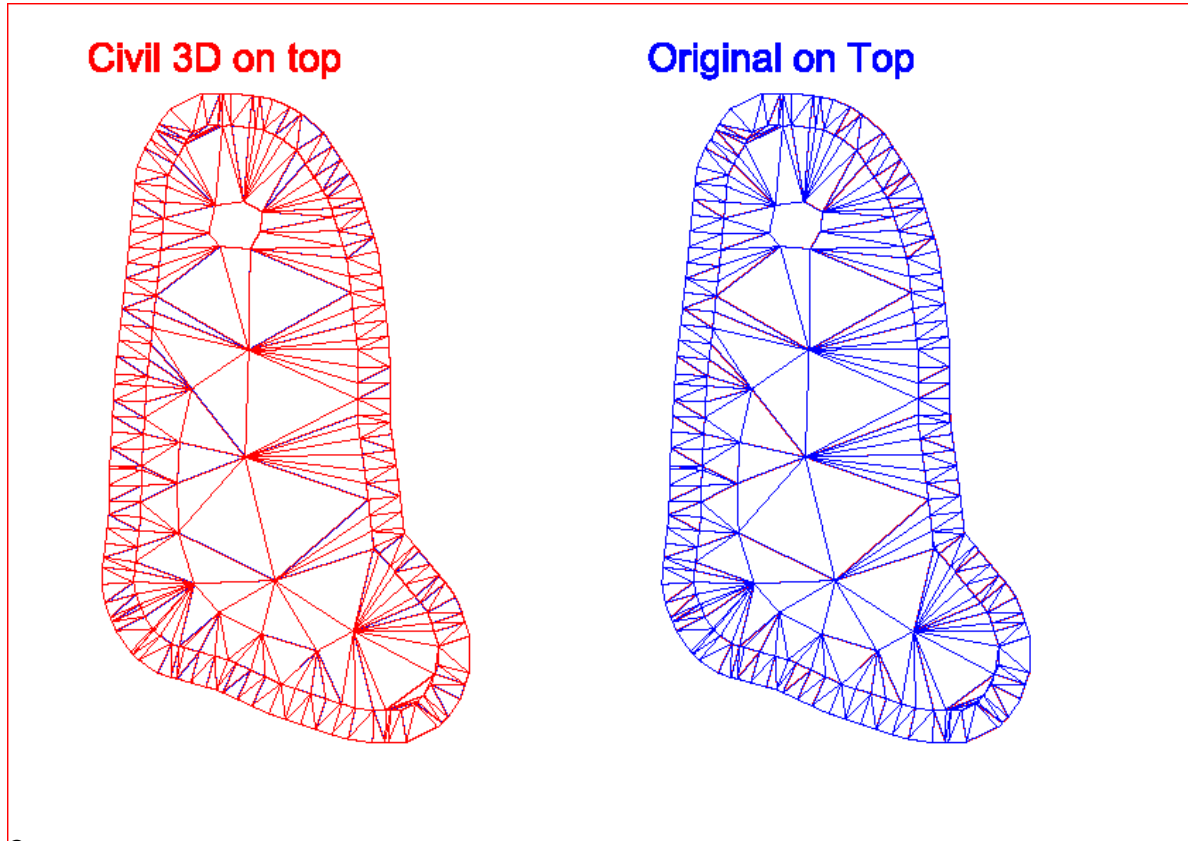


Contours, compare

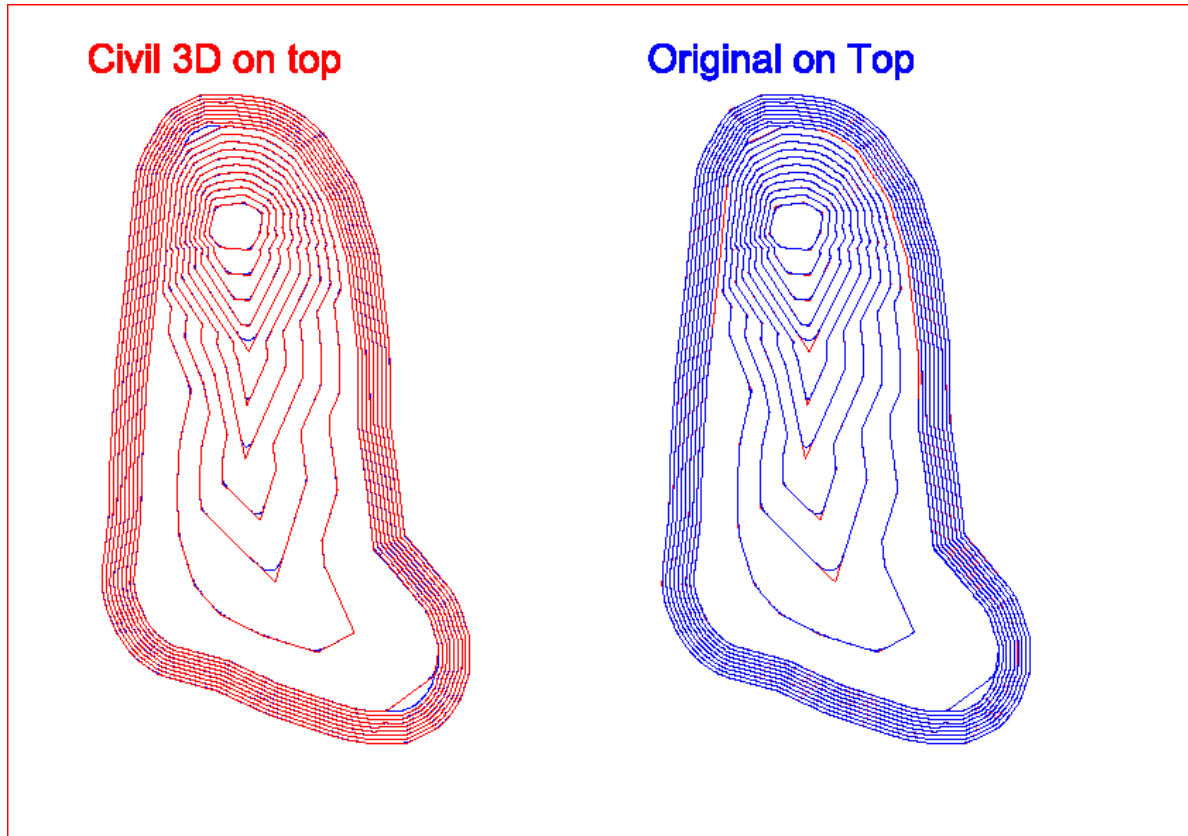


Civil3D

Triangles, compare

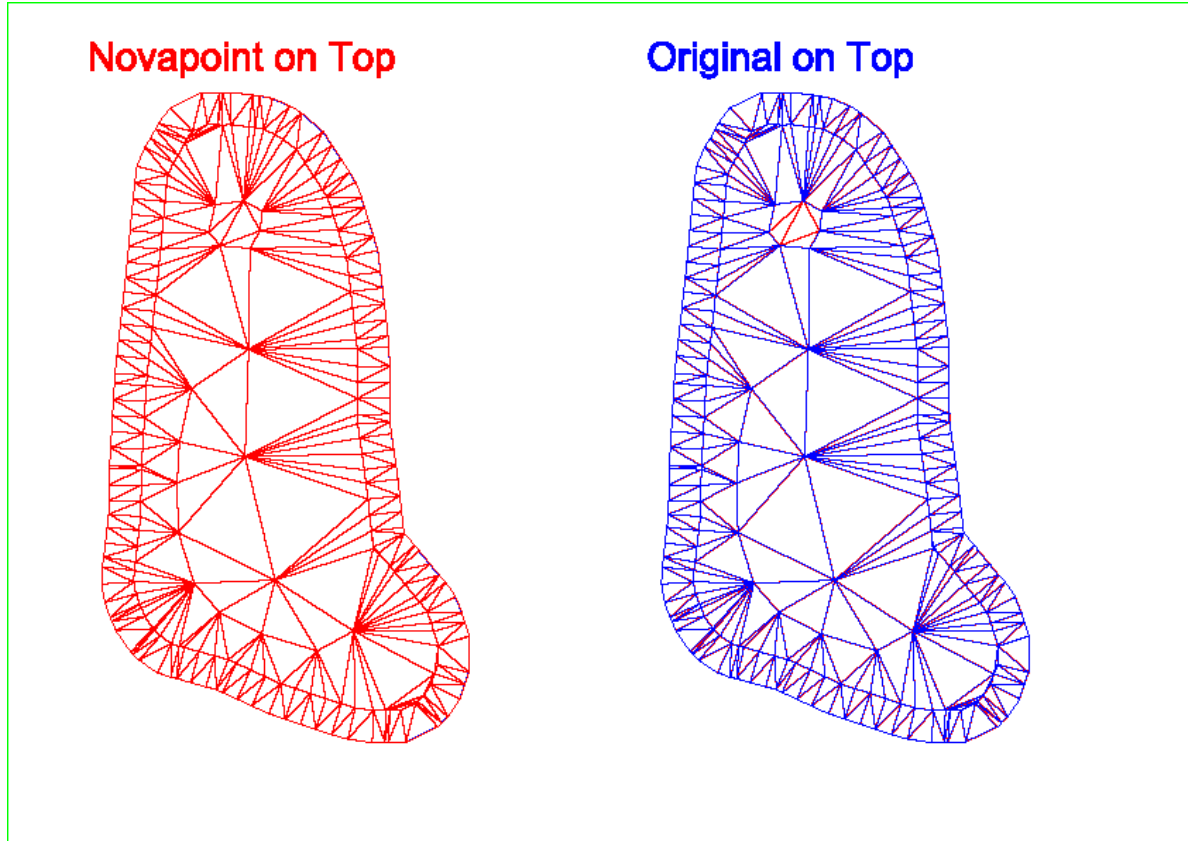


Contours, compare

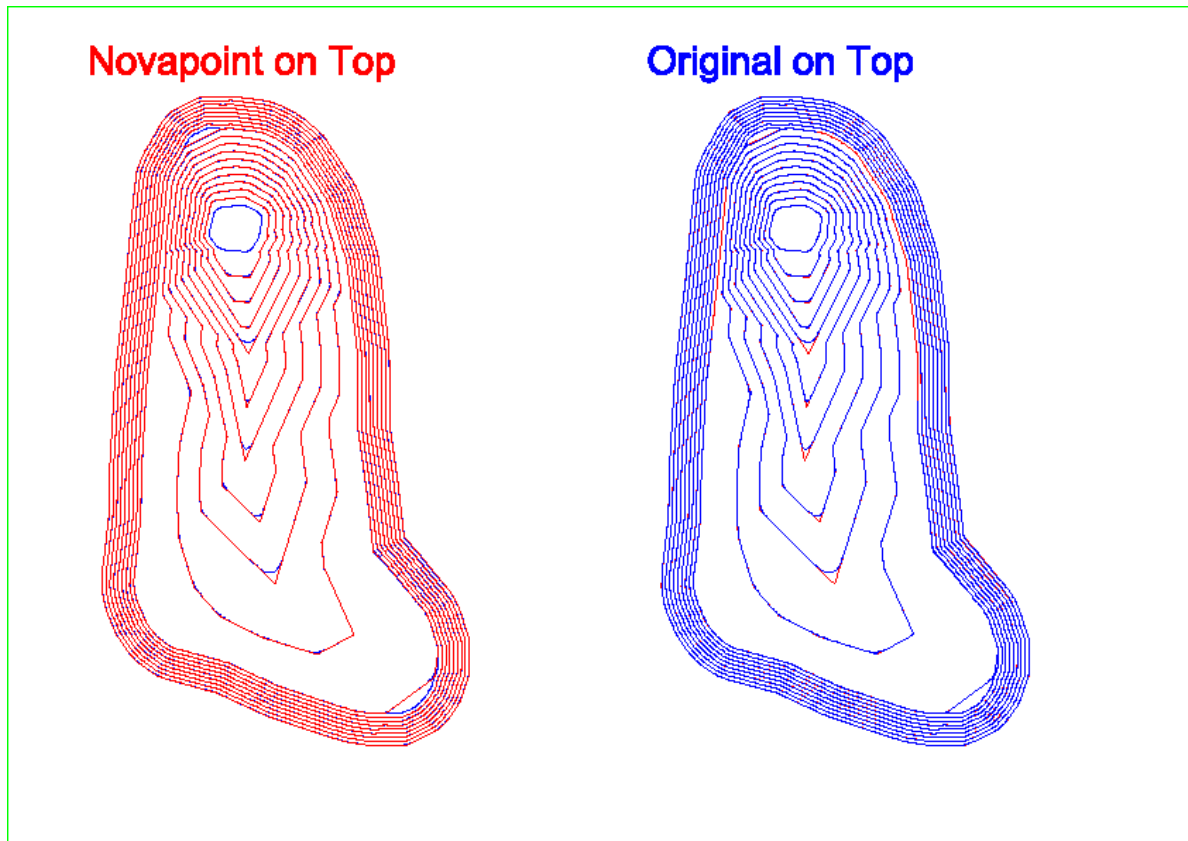


Novapoint

Triangles, compare



Contours, compare



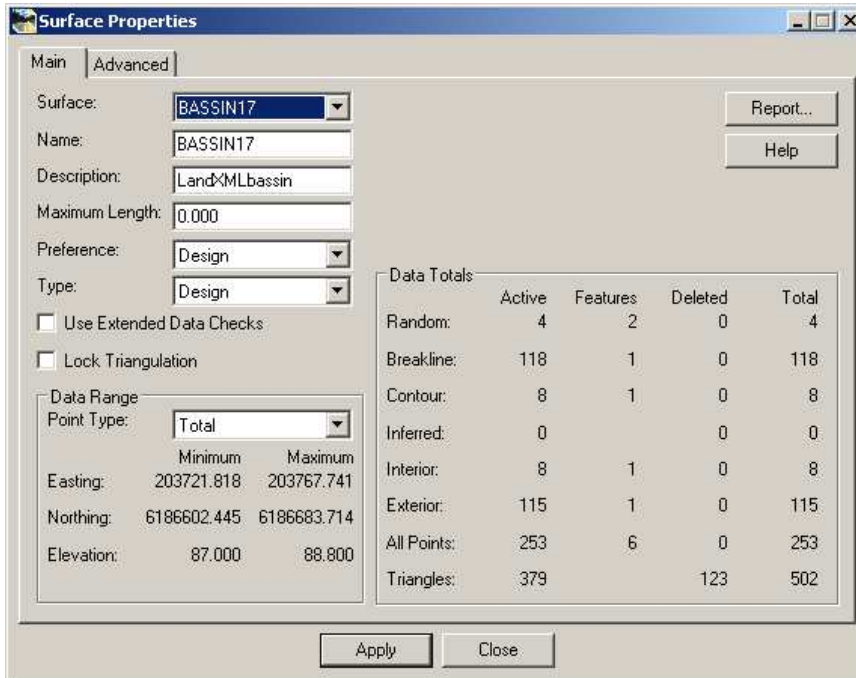
InRoads

Import from XML



Feature type "Contour" do not transfer the name of the feature, but feature type is correct transferred to "Contour"

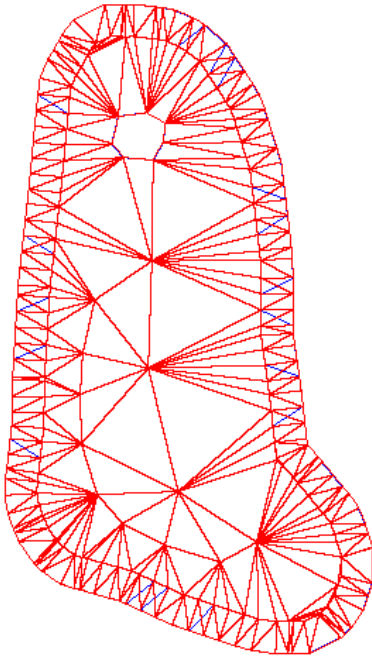
Imported surface, Overview



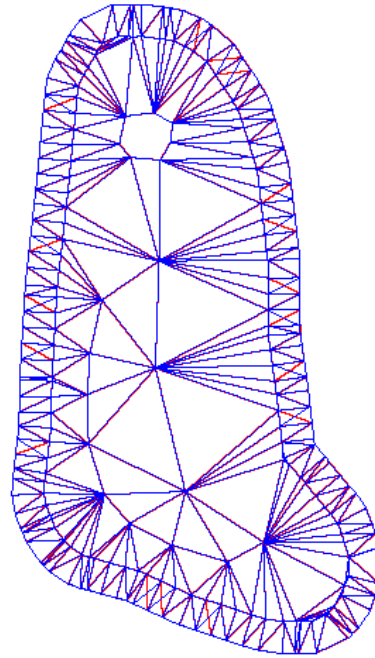
Imported XML, triangulation (import does not include triangles !)

Triangles, compare

InRoads on Top

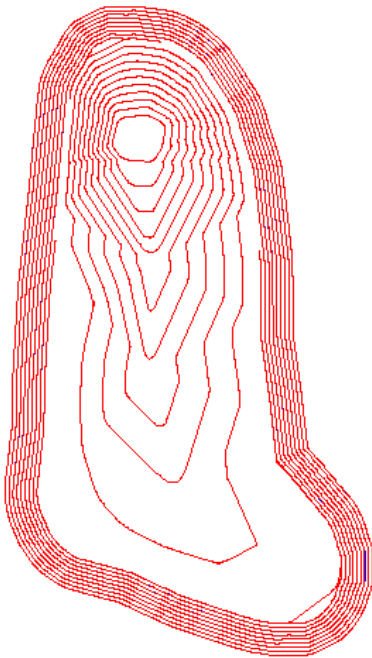


Original on Top



Contours, compare

InRoads on Top



Original on Top

