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Introduktion til MIKE 11

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Publication date:
2003

Document Version
Acceperet manuscript, peer-review version

[Link to publication from Aalborg University](#)

Citation for published version (APA):
Schaarup-Jensen, K. (2003). *Introduktion til MIKE 11*. (s. 14).

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Livslang Uddannelse 2003

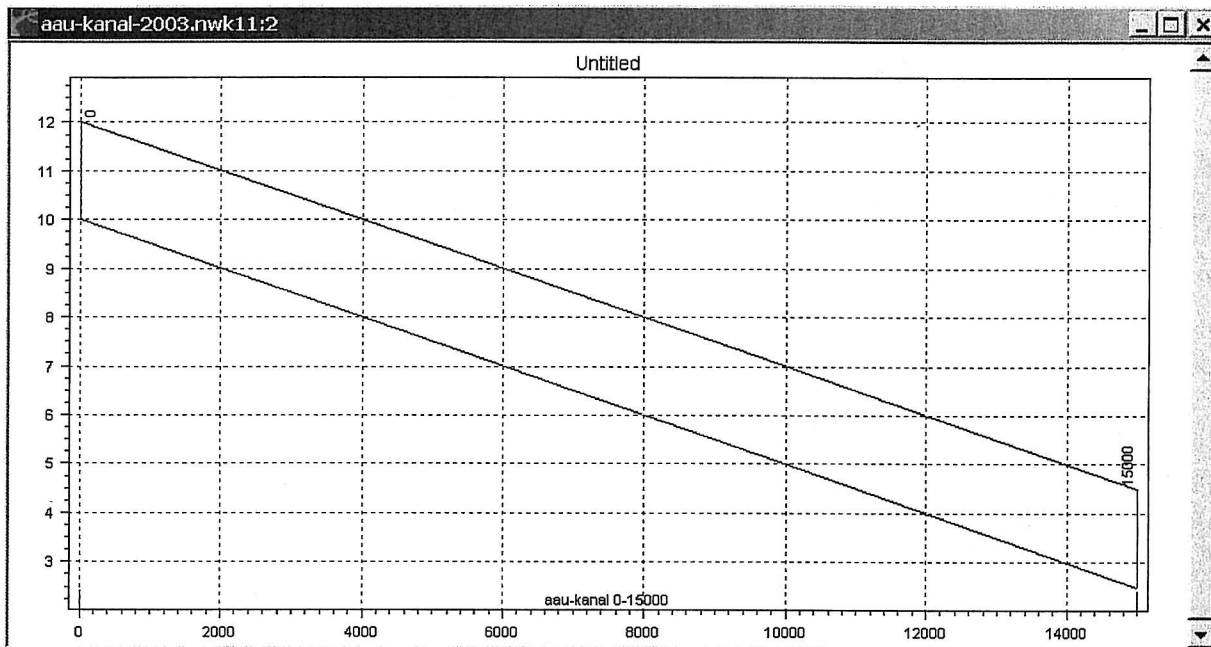
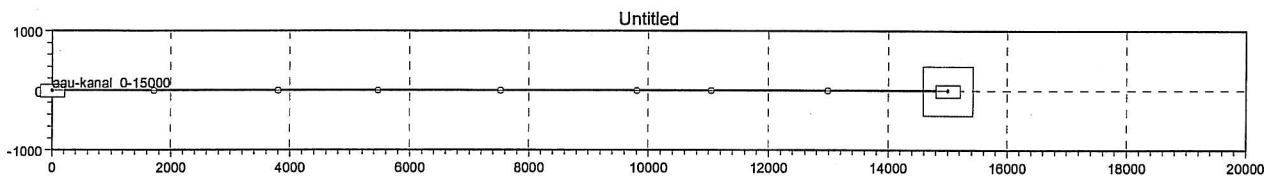
HYDRAULIK 2003

Introduktion til MIKE 11

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Instituttet for Vand, Jord og Miljøteknik

Vandløbsgeometri:



Channel Properties

River name: Topo ID: Chainage:

Section Type: Radius Type:

Coordinates: Apply X: Y:

Left: Right:

Correction of X, coord: Apply Calculate angle Angle:

| ID | X | Z | Resist. | Mark |
|----|--------|-------|---------|------|
| 1 | 0.000 | 4.500 | 1.000 | 1 |
| 2 | 5.000 | 4.500 | 1.000 | |
| 3 | 5.000 | 2.500 | 1.000 | 2 |
| 4 | 10.000 | 2.500 | 1.000 | |
| 5 | 10.000 | 4.500 | 1.000 | |
| 6 | 15.000 | 4.500 | 1.000 | 3 |

Synchronize processed data
 Update processed data automatically

Channel Cross Section

Water Level: Resist.:

Water Level

Cross section X data [meter]

Tidsserie-database:

File Properties [?] [X]

General Information

Title: Livslang-2003 [OK] [Cancel] [Help]

Axis Information

Axis Type: Non-Equidistant Calendar Axis [v]

Start Time: 21-08-2003 12:00:00

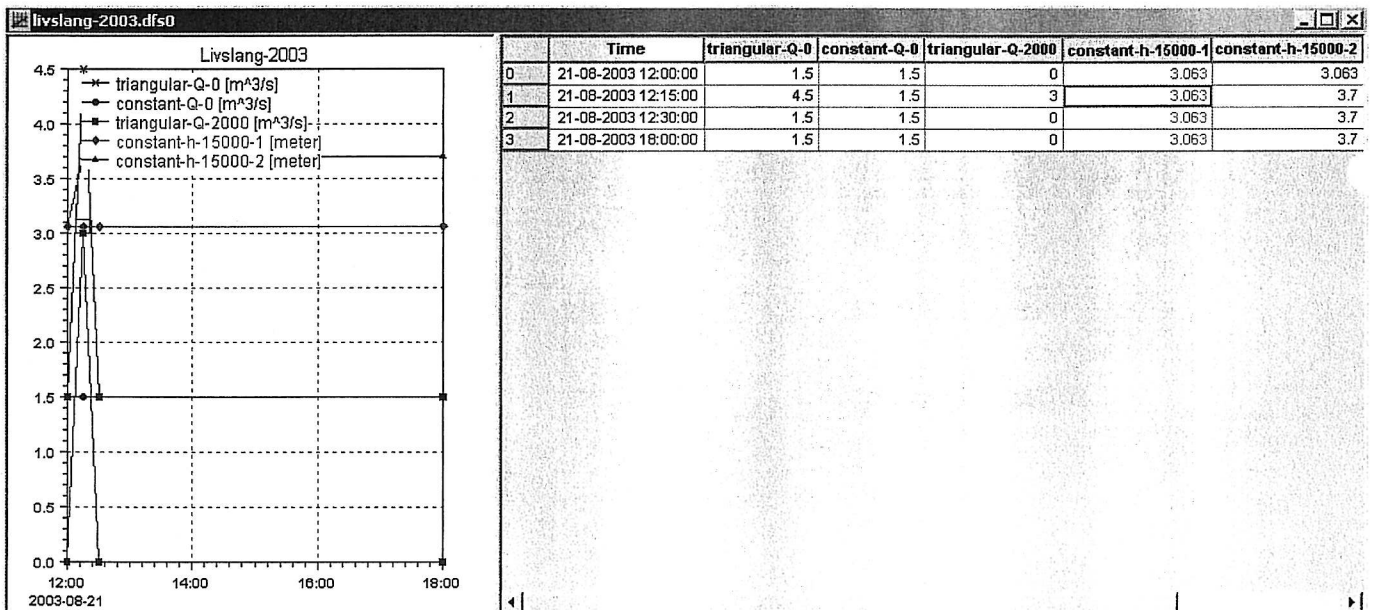
Time Step: 0 [days]
00:00:10 [hour.min:sec]
0.000 [fraction of sec.]

No. of Timesteps: 4 Axis Units: undefined [v]

Item Information

| | Name | Type | Unit | TS Typ |
|---|--------------------|-------------|-------------------|---------------|
| 1 | triangular-Q-0 | Discharge | m ³ /s | Instantaneous |
| 2 | constant-Q-0 | Discharge | m ³ /s | Instantaneous |
| 3 | triangular-Q-2000 | Discharge | m ³ /s | Instantaneous |
| 4 | constant-h-15000-1 | Water Level | meter | Instantaneous |
| 5 | constant-h-15000-2 | Water Level | meter | Instantaneous |

[Insert] [Append] [Delete] [Item Filtering...]



Randdata – opstrøms rand – øvelse 1:

En vandføringsbølge passerer i løbet af 30 min. ind over opstrøms rand.

| | Boundary Description | Boundary Type | Branch Name | Chainage | Chainage | Gate ID | Boundary ID |
|---|----------------------|---------------|-------------|----------|----------|---------|-------------|
| 1 | Open | Inflow | aau-kanal | 0 | 0 | | |
| 2 | Open | Water Level | aau-kanal | 15000 | 0 | | |

Include HD calculation
 Include AD boundaries
 Mike 12

| | Data Type | TS Type | File / Value | TS Info |
|---|------------|---------|------------------------|----------------------|
| 1 | Discharge: | TS Fil | livslang-2003.dfs0 ... | Edit: triangular-Q-0 |

Randdata – nedstrøms rand – øvelse 1:

Vandstanden på nedstrøms rand er konstant under hele simuleringen. Vanddybden på denne rand svarer til naturlig dybde for den i initialbetingelsen definerede konstante vandføring på 1.5 m³/s.

| | Boundary Description | Boundary Type | Branch Name | Chainage | Chainage | Gate ID | Boundary ID |
|---|----------------------|---------------|-------------|----------|----------|---------|-------------|
| 1 | Open | Inflow | aau-kanal | 0 | 0 | | |
| 2 | Open | Water Level | aau-kanal | 15000 | 0 | | |

Include AD boundaries
 Mike 12

| | Data Type | TS Type | File / Value | TS Info |
|---|-------------|---------|------------------------|--------------------------|
| 1 | Water Level | TS Fil | livslang-2003.dfs0 ... | Edit: constant-h-15000-1 |

HD-parametre (bl.a. initialbetingelse og globalt Manningtal):

Livslang-2003.HD11 - Modified

| | | | | |
|--------------|---------------|----------------|---------------------|-----------------|
| Encroachment | Heat Balance | Stratification | MIKE 12 Parameters | MIKE 12 Initial |
| Quasi Steady | Reach Lengths | Add. Output | Flood Plain Resist. | User Def. Marks |
| Initial | Wind | Bed Resist. | Bed Resist. Toolbox | Wave Approx |
| | | | | Default Values |

Initial conditions

Global Values

Water Depth: Water Level

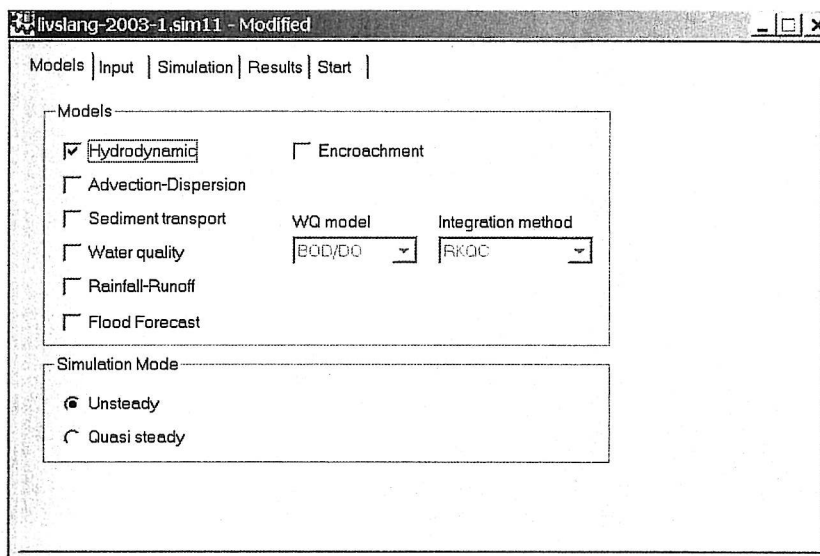
Discharge: Water Depth

Local Values

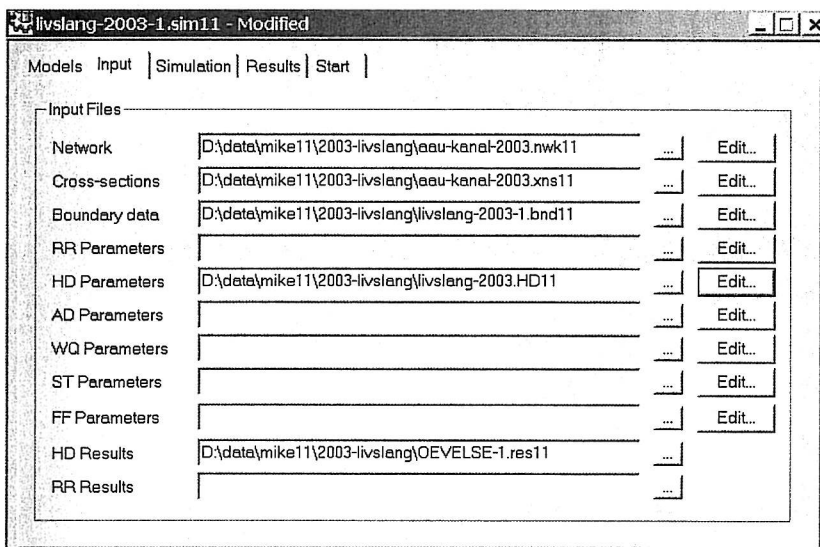
| | River Name | Chainag | Initial y | Initial Q |
|---|------------|---------|-----------|-----------|
| 1 | AAU-KANAL | | 0.563 | 1.5 |

Start af simulering:

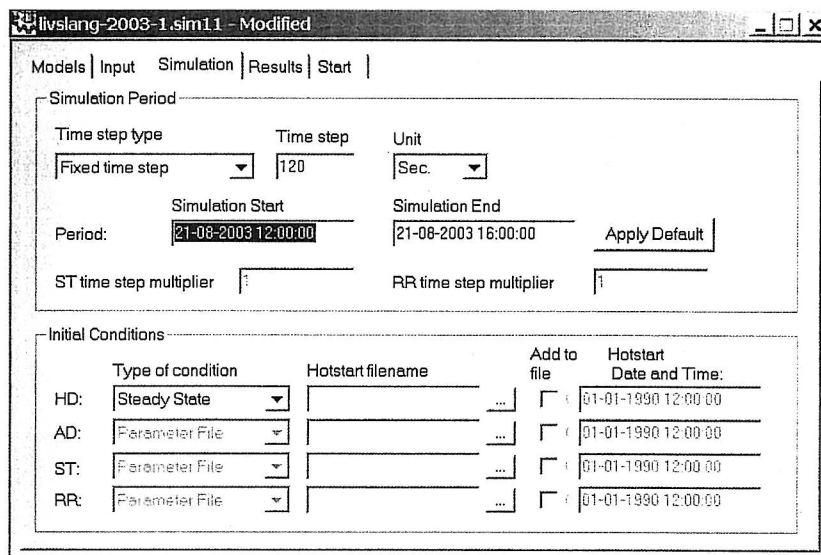
fase 1:



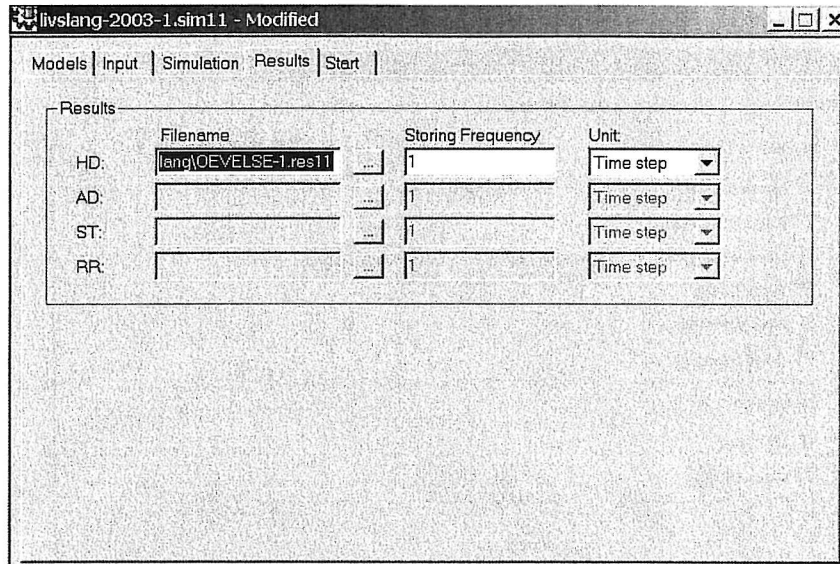
fase 2:



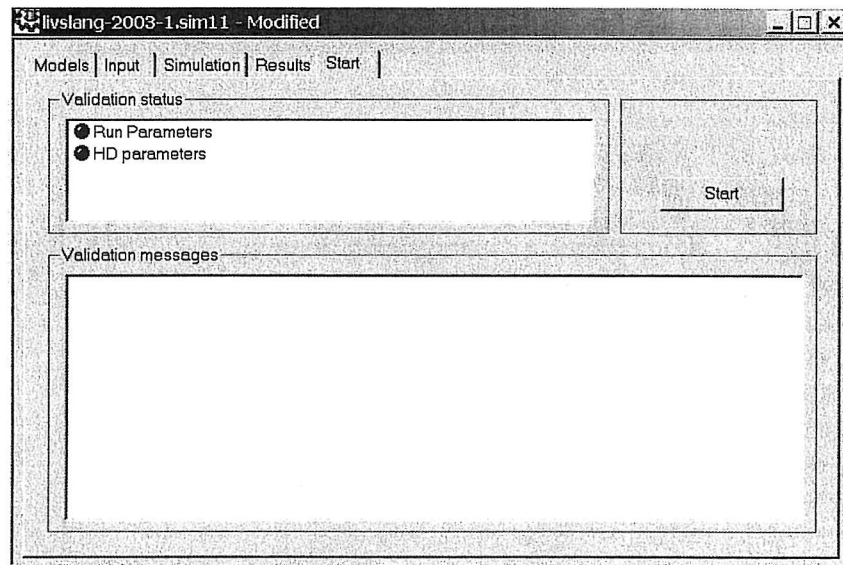
fase 3:



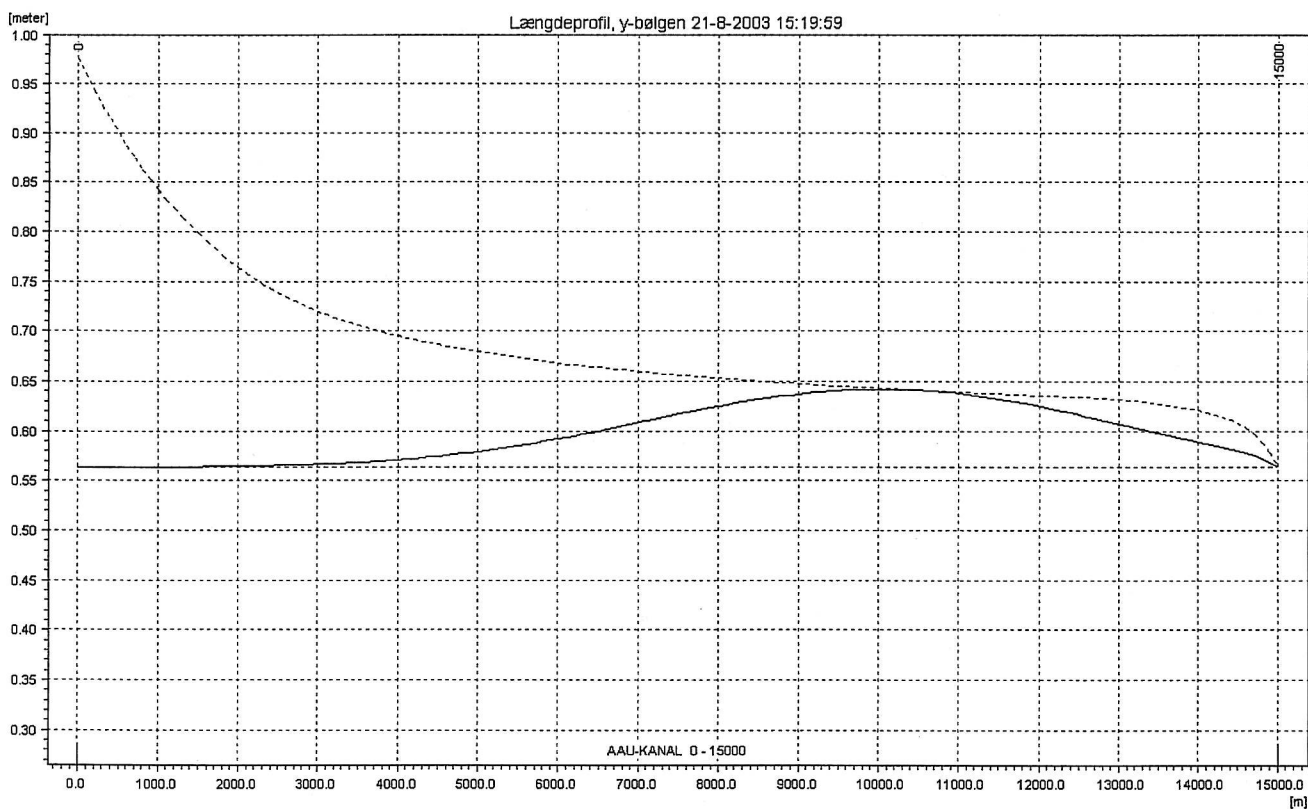
fase 4:



fase 5:



Resultater - øvelse 1:



Randdata – opstrøms rand – øvelse 1b:

Samme randbetingelse som i øvelse 1.

The screenshot shows the MIKE 11 software interface for a project named 'livslang-2003-1.bnd11'. It features a table with boundary data and a section for options.

| | Boundary Description | Boundary Type | Branch Name | Chainage | Chainage | Gate ID | Boundary ID |
|---|----------------------|---------------|-------------|----------|----------|---------|-------------|
| 1 | Open | Inflow | aau-kanal | 0 | 0 | | |
| 2 | Open | Water Level | aau-kanal | 15000 | 0 | | |

Options section:

- Include HD calculation
- Include AD boundaries
- Mike 12

| | Data Type | TS Type | File / Value | TS Info |
|---|-----------|---------|--------------------|----------------|
| 1 | Discharge | TS Fil | livslang-2003.dfs0 | triangular-Q-0 |

Randdata – nedstrøms rand – øvelse 1b:

I stedet for at holde vanstanden/vanddybden konstant på nedstrøms rand introduceres nu en randbetingelse baseret på en Q-h-relation (givet ved Manningformlen), som MIKE 11 selv automatisk beregner.

The screenshot shows the MIKE 11 software interface for a project named 'livslang-2003-1b.bnd11'. It features a table with boundary data and a section for a Q-h relation table.

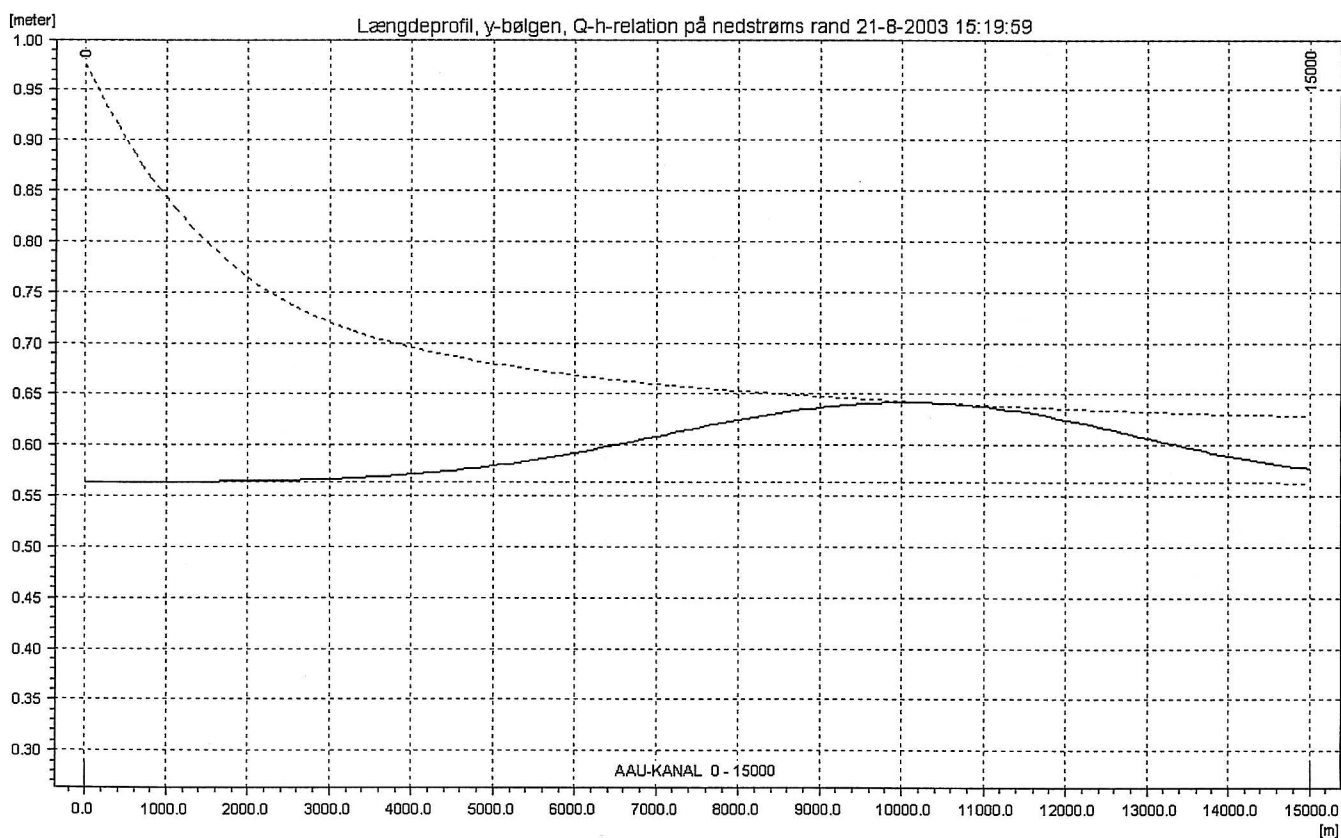
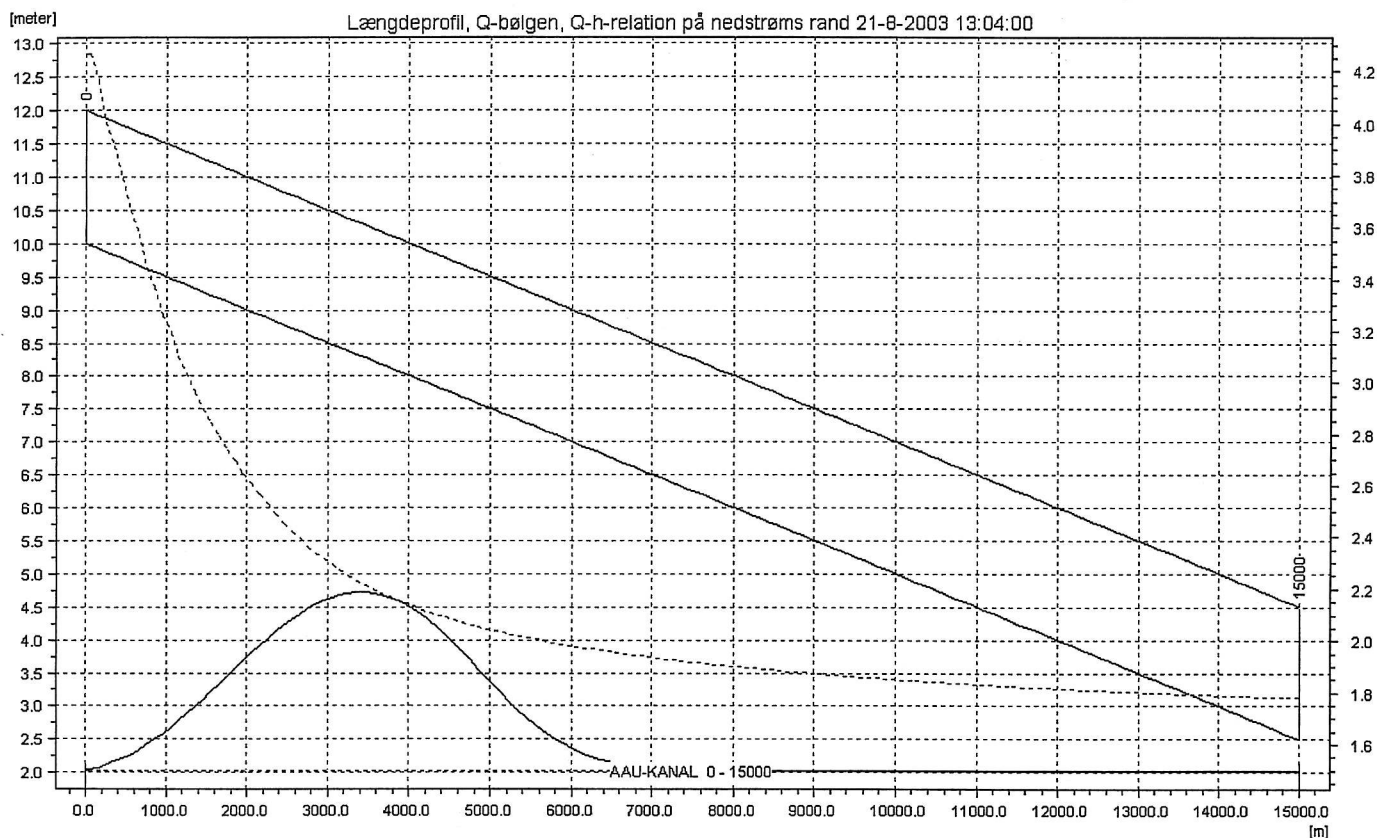
| | Boundary Description | Boundary Type | Branch Name | Chainage | Chainage | Gate ID | Boundary ID |
|---|----------------------|---------------|-------------|----------|----------|---------|-------------|
| 1 | Open | Inflow | aau-kanal | 0 | 0 | | |
| 2 | Open | Q-h | aau-kanal | 15000 | 0 | | |

Options section:

- Include AD boundaries

| | h | Q |
|----|-----------|-------------|
| 1 | 2.5 | 0 |
| 2 | 2.55 | 0.029950096 |
| 3 | 2.6109375 | 0.111277658 |
| 4 | 2.671875 | 0.227310116 |
| 5 | 2.7328125 | 0.371317659 |
| 6 | 2.79375 | 0.539071578 |
| 7 | 2.915625 | 0.934307849 |
| 8 | 3.0375 | 1.395602033 |
| 9 | 3.159375 | 1.911151051 |
| 10 | 3.28125 | 2.47328744 |

Resultater - øvelse 1b:



Randdata – opstrøms rand – øvelse 2:

Vandføringen ændres nu her til at være konstant = 1.5 m³/s.

| Boundary Description | Boundary Type | Branch Name | Chainage | Chainage | Gate ID | Boundary ID |
|----------------------|---------------|-------------|----------|----------|---------|-------------|
| 1 Open | Inflow | aau-kanal | 0 | 0 | | |
| 2 Open | Q-h | aau-kanal | 15000 | 0 | | |
| 3 Point Source | Inflow | aau-kanal | 2000 | 0 | | |

Include HD calculation
 Include AD boundaries
 Mike 12

| Data Type | TS Type | File / Value | TS Info |
|--------------|---------|-----------------------------|--------------|
| 1 Discharge: | TS Fil | livslang-2003.dfs0 ... Edit | constant-Q-0 |

Randdata – nedstrøms rand – øvelse 2:

Identisk med den i øvelse 1b benyttede randbetingelse samme sted.

Randdata – sidetilløb (point source) i station 2000m – øvelse 2:

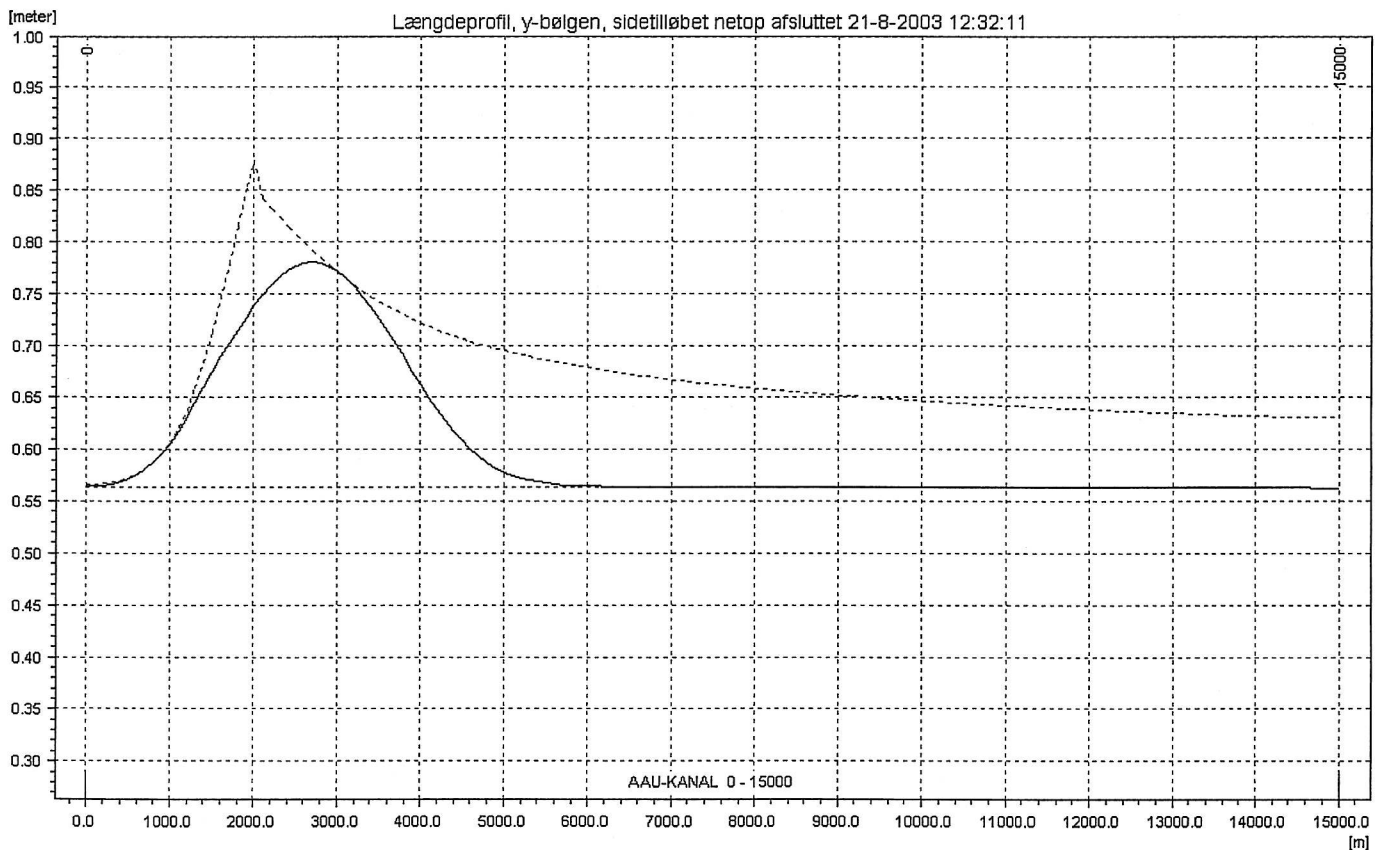
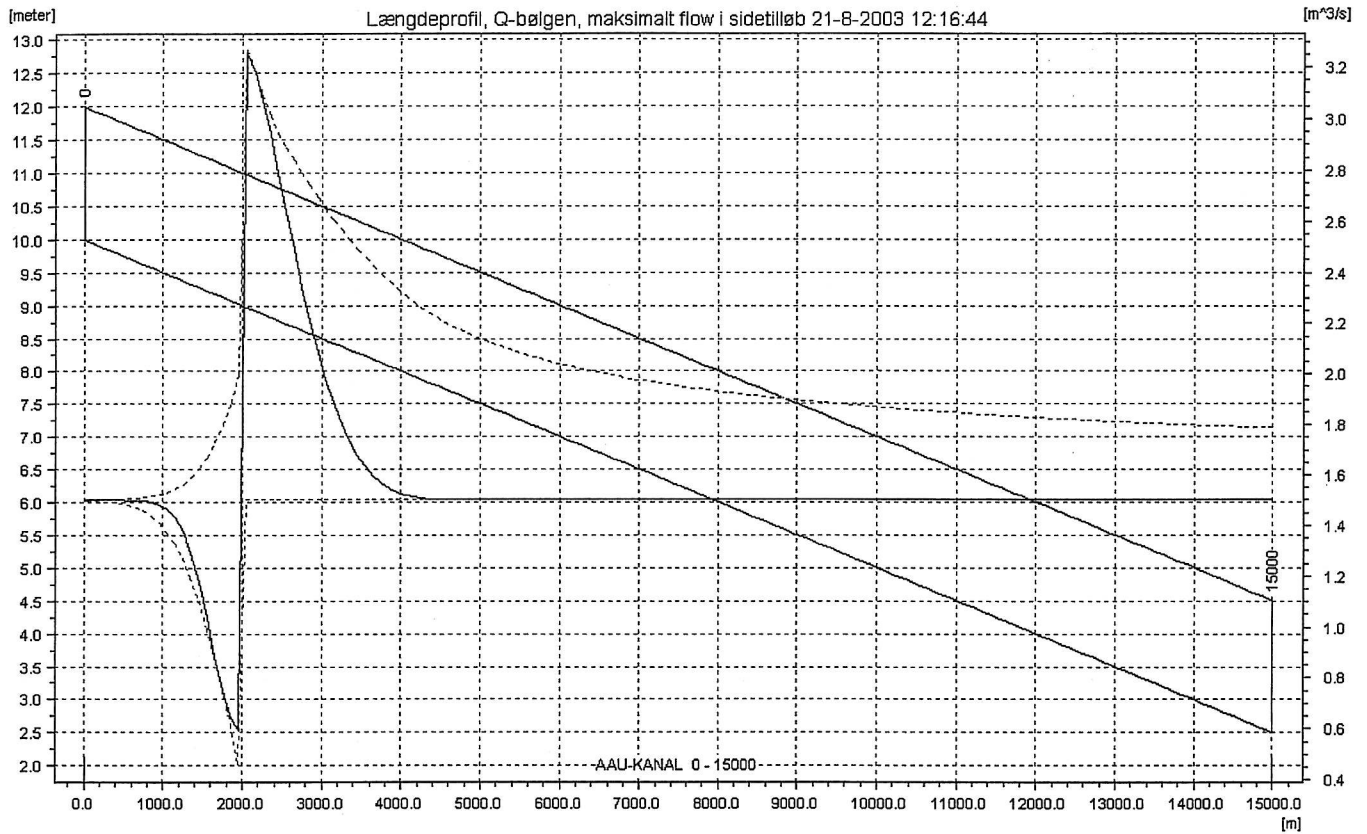
2000 m. nedstrøms for opstrøms rand introduceres der nu et sidetilløb med tidsvariende vandføring. Vandføringen har en trekantformet karakter startende med 0 til tiden t=0 min., hvorfra den vokser lineært til 3.0 m³/s til t=15 min., for så igen at aftage lineært til 0, der nås til t= 30 min.

| Boundary Description | Boundary Type | Branch Name | Chainage | Chainage | Gate ID | Boundary ID |
|----------------------|---------------|-------------|----------|----------|---------|-------------|
| 1 Open | Inflow | aau-kanal | 0 | 0 | | |
| 2 Open | Q-h | aau-kanal | 15000 | 0 | | |
| 3 Point Source | Inflow | aau-kanal | 2000 | 0 | | |

Include HD calculation
 Include AD boundaries
 AD - RR
 Mike 12

| Data Type | TS Type | File / Value | TS Info |
|--------------|---------|-----------------------------|-------------------|
| 1 Discharge: | TS Fil | livslang-2003.dfs0 ... Edit | triangular-Q-2000 |

Resultater - øvelse 2:



Randdata – opstrøms rand – øvelse 3:

Identisk med den i øvelse 2 benyttede randbetingelse samme sted!

Randdata – nedstrøms rand – øvelse 3:

Vandstanden stiger i løbet af 15 min. fra ét niveau (svarende til stationær og énsformig strømning i vandløbet til t=0) til et nyt konstant niveau, der ligger ca. 0,64 m. højere.

| Boundary Description | Boundary Type | Branch Name | Chainage | Chainage | Gate ID | Boundary ID |
|----------------------|---------------|-------------|----------|----------|---------|-------------|
| 1 Open | Inflow | aaU-kanal | 0 | 0 | | |
| 2 Open | Water Level | aaU-kanal | 15000 | 0 | | |

Include AD boundaries
 Mike 12

| | Data Type | TS Type | File / Value | TS Info |
|---|-----------|---------|-----------------------------|--------------------|
| 1 | Water Lev | TS Fil | livslang-2003.dfs0 ... Edit | constant-h-15000-2 |

Resultater - øvelse 3:

