xylem
Let's Solve Water

Application Note
2018, August

Discharge monitoring in a tidally affected river with the SonTek SL in Southern Malaysia

Background

In 2011 a series of gauging stations was established along the Johor River which measured river water level and velocity to gain a better understanding of the existing river flows. The Johor River is an important source of water for several water treatment plants. However during high tides and in dry seasons, a salt water wedge pushes upstream affecting water quality and thus water supply.

Challenge

The measurement objectives and locations along the Johor and Linggiu River represented many challenges. Accurate continuous discharge data was required quickly in locations where tidal influence causing variable back water effects and also reverse flows were present. In addition, the locations were remote with limited access making installation and commissioning work difficult.

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Xylem Solution

Greenspan Singapore Pte Ltd was engaged to undertake the project and chose SonTek Side Looking sensors which combine continuous measurement of level and velocity to continuously derive discharge at the three locations. For velocity index development and cross section measurement, a SonTek ADCP RiverSurveyor system was used.

Application

Continuous water level, velocity and discharge data was recorded by the sensors for the measurement locations. A velocity index for each site was developed for a range of water levels by undertaking discharge measurements during releases of water from the upstream reservoir.

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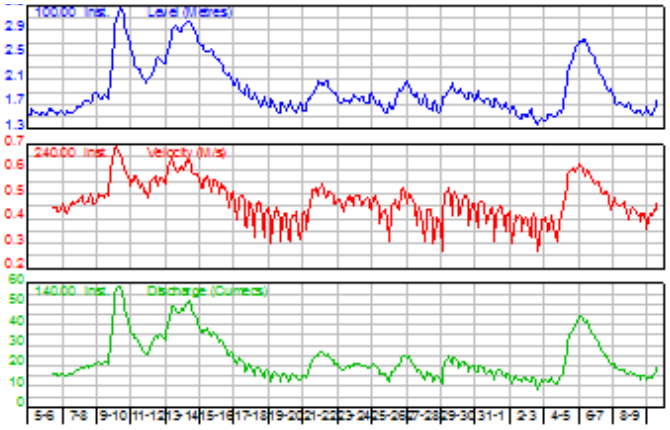
Water Level, Velocity and Discharge Hydrograph

Period 37 Day Plot Start 00:00_05/05/2010
Interval2 Hour Plot End 00:00_11/06/2010
Site SG_JOHOR_S Sungai Johor at Semangar Bridge



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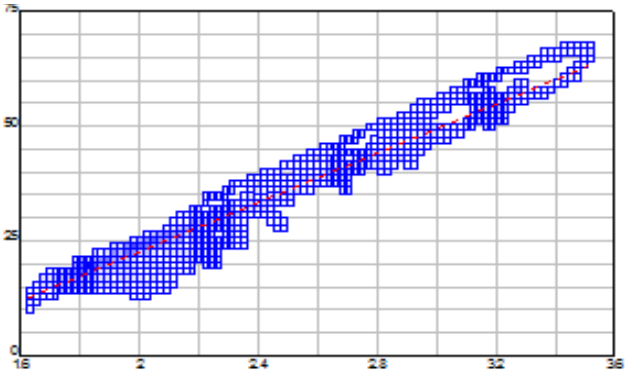
Stage vs Discharge Scattergraph

Axis	Transform	Site	Type
X (ind)	(None)	SG_JOHOR_S	Inst
Y (dep)	(None)	SG_JOHOR_S	Inst
Interval	2 Minute		
Start	00:00_20/04/2010		
End	00:00_12/06/2010		



Downstream site with tidal affects during low flows and multiple loop stage to discharge rating

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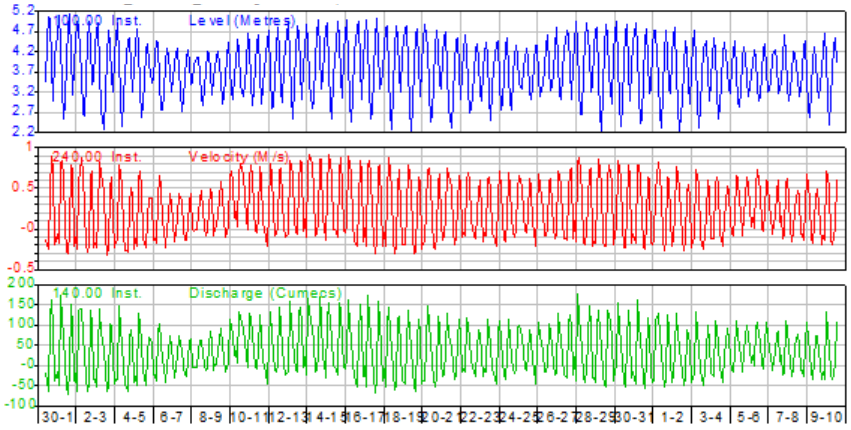
Period 42 Day Plot Start 00:00_30/04/2010
Interval2 Hour Plot End 00:00_11/06/2010
Site SG_JOHOR_P Sungai Johor upstream of PUB Intake



Most downstream site with tidal signature and reverse flows

Customer`s Feedback

Faizal Yusoff, the lead Field Hydrographer from Greenspan, noted that the Sontek SL provided good data record for unattended monitoring. It was also a surprise that the backwater affects from the tide were experienced so far upstream, particularly during low flows which meant direct measurement of velocity was in fact critical as traditional stage to discharge ratings would have yielded high uncertainties due to the loop rating.

SonTek
a xylem brand

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