

FOCUS

The Gorai and South-west Region

by Amjad Hossain Khan

The Ganges Water Treaty of 1996 for 30 years has provided for assured flows in the Ganges under the sharing arrangements for the critical months. It is necessary to closely monitor the water level and discharge of the Ganges and its relationship with the Gorai.

The Gorai, the only distributary of the Ganges in Bangladesh is the life line for the entire south-west region. The World's heritage, the Sundarbans, also depends on the sweet water from the Gorai. The ecological system which developed over the centuries were dependent on the Gorai and natural rivers and channels of the south-west.

The Gorai takes off 16 km downstream of Hardinge Bridge near Talbaria and flows in the southern direction by the side of Kushtia town. During its course below Kumarkhal the river is known as Kumar and then Madhumati. Near Kachua, it is called Baleswar and ultimately falls into the Bay of Bengal where it is known as Haringhata. A branch of the Gorai flows through Halifax cut renamed as Nabaganga-Atrai and joins Rupsa and falls into Passur river. The Gorai flow is vital for the south-west region to prevent the ecological balance, preventing salt water intrusion further inland. Depending on the Gorai flows, a number of water management schemes were taken up in the Madhumati-Nabaganga sector for irrigation from the surface water and maintaining a balance of ground water. Decades back the river Gorai used to be navigable most of its way and streamers used to ply through. The IGN and RSN steamer companies used to maintain the navigation in the river by undertaking river training works.

Since 1947 with rapid development in the road sector, the importance of the Gorai was reduced drastically. Some of the hydraulic structures built for navigation and irrigation along the Madaripur beel route were not maintained properly. The Gorai has been gradually deteriorating over the last two-and-half decades.

The problem became acute since 1989 due to the unilateral withdrawal of water of Ganges. The Gorai silted up heavily and completely closed over the last four-five years.

The River Survey Project

(FAP-24) under the Flood Action Plan made a detailed study on the morphology of Gorai offtake (Special Report No 10, October, 1996). According to the findings of the study—

- 1) The minimum water level of the Ganges has clearly fallen since 1964 by more than 2.5 meters. The drop was particularly sharp since 1987 gradually over the entire period. A clear decrease in water level took place in the second half of the 1970s which coincides with the operation of the Farakka Barrage. The maximum water level does not show any decreasing or increasing trend.
- 2) On average the water level of the Ganges at the end of monsoon period has clearly been falling much faster during the latest 10-year period (1985-95) than it did during 1964-73. The fall time has gradually decreased over the last 30 years. The water level fall from 11m PWD to 7m PWD now takes only as long a time as it did 20 years ago. This implies that a dry season flow channel on average has roughly only half as long time to develop erosion than it had 20 years ago.
- 3) The threshold bed level of the Gorai mouth has been varying by up to more than 3 meters from 4m PWD in 1966 to 7.2m PWD in 1980. A sharp increase appears to have taken place at the high floods of 1987 and 1988. Before 1987, the bed level varied by 1.5m approximately in a seemingly periodic way (period 6 to 12 years).
- 4) Two factors may separately or in combination cause the closure of the Gorai offtake. Dropping dry season water level in the Ganges, and increasing threshold bed level of the Gorai mouth. It was found that both the factors have been effective.
- 5) Closure or near closure of the offtake during the dry sea-

son has occurred now and again during the 30-year period. The tendency to close every year was initiated by a sharp bed level rise at the Gorai mouth in 1987 which continued in 1988. The sharp drop in the minimum water level in the Ganges since 1987 made it increasingly likely that closure in the future will take place every year.

6) The increasing bed level after 1987 seems to have reduced the conveyance factor for all stages of the flow.

7) There was a tendency of narrowing of the lower part of the cross section initially in 1982 and if increased from 1989. This may be due to dredging of narrow channels. The intermediate part of the cross section, and to some extent also the upper part show a tendency of widening since 1987.

The Government was aware of the importance of the Gorai for flushing sweet water in the south-west. To keep the flow open, dredging was engaged in 1977. A narrow channel was excavated. It continued to keep the flow up to 1981 when heavy siltation choked the river mouth. Dredging was again employed in 1982 and 1983 but failed to keep the mouth open. A scheme was taken under National Dredging Scheme, Phase I where it was planned to dredge 13 km up to Gorai Railway Bridge. Under this scheme 6 km dredging was planned in 1992 by employing two 18-inch dredgers. Survey in November 1993 showed that the bed level of Gorai had silted up by 3.5 meter. Recent survey in December 1996 showed that the bed level has further silted up.

The River Survey Project (FAP-24) in their study found the reasons for the deteriorating conditions of the Gorai offtake. The project set up two models, an overall hydrodynamic model and a local fully morphological model, calibrated and applied for investigation of the offtake mechanism. The conclusions of the model studies are given below:

1) Hydrodynamics and sediment transport rates were reproduced to a satisfactory degree in the two models. The aim of the morphological modelling was to stimulate the dynamic (short term) equilibrium of bed levels at the offtake. The simulated and measured bed level changes of the Ganges river showed some discrepancies with respect to location and extent of erosion and deposition.

2) The development of the curvature of the land of Gorai offtake is cyclic in time (period of the order of 40-50 years). Presently the development is towards a sharper bend; it is likely this will continue for some years ahead.

3) The total volume of erosion upstream of Gorai offtake has been estimated in the volume of 10 million m³/year (deposited volume), corresponding to an average contribution to the sediment transport balance of this area of approximately 0.2 m³/s (grain volume).

4) The main features and developments of the bathymetry at and near Gorai mouth over a monsoon period are:

- The deepest channel becomes more shallow and wide at the peak of the monsoon and deeper and more narrow after the monsoon;
- The change in position and direction of the deepest channel seems to be minor, although there seems to be a tendency that the main offtake channel makes 1/2-wrads the left bank of Gorai;
- The 1992 bathymetry shows presence of two offtake

channels. The tendency of two channels were also observed in 1995 bathymetry.

5) Water level slopes in the upper Gorai down to Gorai Railway Bridge indicate that the controlling cross section moves during the monsoon. At the lower stages in the Ganges the Gorai mouth is clearly a controlling section, but as the discharge to the Gorai increases at higher stages of the Ganges, the control vanishes. It may have been replaced by a control further downstream.

The following points were confirmed by 2D modelling by the River Survey Project studies:

1) The flood dynamics (rate of water level changes) is important for the development of the offtake. a) during rising stage, the bed level at the offtake raises and the channel become wider; b) during falling stage, the bed level drops and the channel become narrower.

2) Development of the bar in front of the offtake is quite sensitive to the flow resistance in the downstream reach of the Gorai. The sensitivity of the bar development to the sediment transport of the Ganges may be high but needs to be further tested.

3) By careful calibration of the flow and sediment transport at the entrance, it is possible to reproduce the shape of the outlet channel, which has some effect on the river development further downstream.

4) A sudden increase in bed levels at the offtake (due to, for instance, one year of severe flooding) would remain in the following year after a normal flood event.

5) The 2D model provided valuable information about distribution of sediment at an

offtake which can be used in an ID model for long term prediction.

The study undertaken by River Survey Project was time bound where more emphasis was given to understand the offtake mechanism. It has contributed to a scientific explanation for the closure of the Gorai river. The potential for using the 2D modelling for such investigation has been demonstrated. Other tools are necessary to study the long term effects. Considering the importance of the Gorai which is a life-line for the entire south-west region, it is necessary that mathematical study should continue. The Surface Water Modelling Centre (SWMC) is capable of undertaking the study.

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Recently another attempt to keep the Gorai mouth open was taken up by the Government. This is a 3-year project at a cost of Tk 47 crore. Initially manual labours will be used followed by dredging. Past experience and the study by the River Survey Project clearly indicate the futility of such adhoc arrangements. While we do appreciate the attempt made by the Government, we suggest that along with this, we should also undertake the ID mathematical model to study the offtake of Gorai for a long term solution. It will be worthwhile to take up this study from now on so that it can help Bangladesh in preparing her case during review of the Ganges Water Treaty for more water during critical months of March and April to keep the Gorai flowing to save the south-west region of Bangladesh.

The writer is former Chairman, Bangladesh Water Development Board.



The new orange and green or blue and red foot bridges spanning the busy streets of Dhaka are a sight for sore eyes. When the first time I saw the painters applying orange paint in places, I was rather baffled and amused. Knowing Dhaka and the conservative, boring architecture and designs it adheres to, wouldn't you? People in Dhaka still think that a house should be either white or yellowish cream, two shades that have survived for decades. And post-Hotel Sonargaon, that particular shade of beige, known colloquially as Sonargaon colour, became a deserving third to the other two basic colours. But someone has had the vision to break away from the hideous blueish grey shades used in the old over bridges, especially at Farmgate where there are a network of walkways in the air which have suddenly seen a rise in their popularity. What choice do the pedestrians have now since the authorities have erected a 4 feet high grill fence on the road divider? It's quite an inconvenience to climb over these spiked rods and not to mention risky too. But the dangers involved in crossing the hurdles have succeeded in converting people, albeit grudgingly, to try a walk in the clouds. However,

the rickety structure of the bevy of walkways scattered all around do cause a tremor in my heart whenever I pass underneath. It seems a miracle that they are standing upright on those unbelievably skinny pillars.

The new ones on the other hand, at a few strategic points in the city, apart from the bright colours that exude contagious cheerfulness, took only a few weeks to build and are a far more pleasant sight than their ungainly predecessors. Dhaka pedestrians were just looking for something like this — sturdy but with the least ado. However, not for the purpose you think. The people who jaywalked in front of the IPGMR are still continuing their battle against traffic rules and regulations. The people who walked across from BIRDEM to the other side are still doing their sleep-walk impersonations. But those who were all dressed up before and had nowhere to go, have a destination now. They are seen in groups of threes and fours posing for photographs on the orange footbridge or else just leaning on the rails and looking at the traffic rushing from both sides. Now how about some open air cafes — tables for two placed under the awfully cute lamp posts on the bridges?

India's First Long-term Circulatory Assistance in a Child

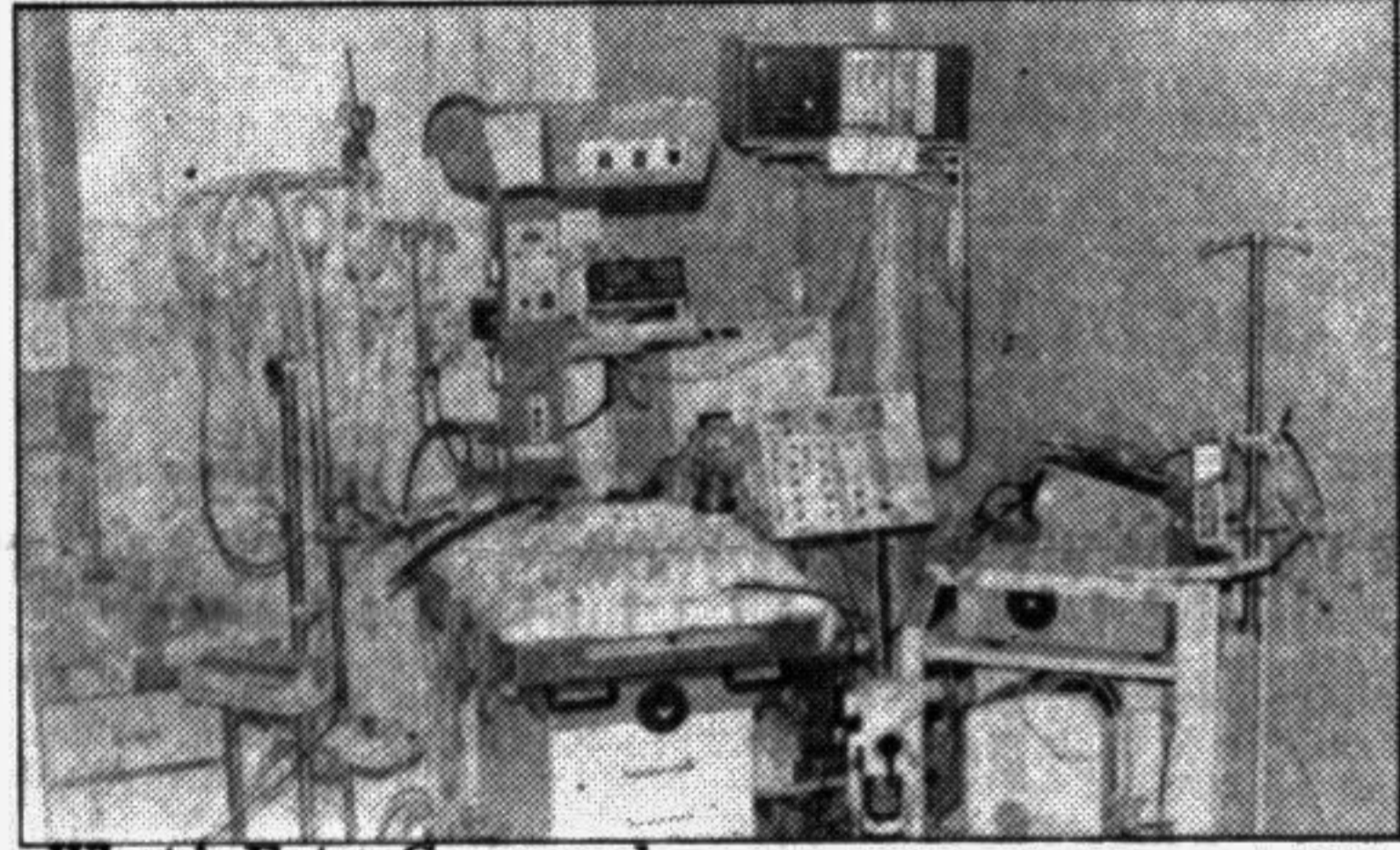
Dr Devi Shetty writes from Calcutta

PIYALI is a one-and-half-year-old child suffering from a complex heart problem called Nerrotis syndrome in which she has five abnormalities of the heart affecting the main pumping chambers. She was extremely unwell and blue before operation.

She had a major reconstructive operation on the heart to repair all the abnormalities. Two days after the operation, she developed acute congestion in the lungs leading to respiratory failure which resulted in acute heart and kidney failure. Since she did not respond to the traditional treatment and death was imminent, we connected her to an artificial heart, artificial lung and dialysis for kidney failure. This technique is called Extra Corporeal Membrane Oxygenation (ECMO). This is a standardised technique in the western world for neonates with respiratory distress.

However, ECMO on children for post-operative heart and lung failure is an extremely complicated procedure with very little experience all over the world. In fact, most of the centers in UK have given up post-operative ECMO programme. Piyal had no chance to survive, but for the ECMO. She was kept alive with artificial heart, lungs and dialysis for three days during which time her own organs recovered and could be weaned off from the artificial organs successfully.

Piyali is one of the very few children in the world to owe her life to the latest developments in artificial organs. This is one of the extremely high risk operation in the world which has been successfully performed because of the availability of expertise, latest medical equipments and extremely efficient patient management.



What is Extra Corporeal Membrane Oxygenation (ECMO)?
Extra Corporeal Membrane Oxygenation is a technique popularised by Dr Glen Pennigton of St Louis, Missouri, USA. It was used to resuscitate newborn babies suffering from respiratory distress. A condition called Meconium aspiration in children can cause severe lung failure which will not respond

to traditional treatment with regular breathing machine (ventilator). Similarly, severe burn injury of the lungs can also cause similar problems in adults. When the lung fails as a gas exchanger for oxygen, we need to directly transfer oxygen to the blood. This is achieved by an artificial lung called oxygenator. Oxygenators are routinely used for all open-heart surgeries. However, these oxygenators work only for few hours. A company called CIMED makes oxygenators for ECMO which can run for few days. ECMO also needs a pump which would work like heart to pump the blood into the human body. Following operation, if the child or an adult develops heart or lung failure, ECMO can temporarily support these vital organs for few days.

Along with the failure of heart and the lungs, kidney also fails, most of the time. So we need to add an artificial kidney

(continuous arterio venous haemofiltration) to drive away metabolic end products which are toxic to the body. Essentially with the technology available, we can support heart, lungs and kidneys for few days giving the nature a chance to resuscitate the vital organs of the body.

Currently, B M Birla Heart Research Centre is one of the very few centers in the world having expertise in ECMO on children. Today, most of the congenital heart surgery on children carries a success rate of 98 per cent to 99 per cent. Why one out of one hundred die following operations? It is our aim to ultimately perform every heart operation with zero per cent risk. ECMO will be an important tool for this goal.

The writer is Clinical Director and Chief Cardiac Surgeon, Department of Cardiac Surgery at B M Birla Heart Research Centre.

The Daily Star Entertainment Guide

Wednesday 5th March
(All programmes are in local time. There may be changes in the programmes)

BTV
3:00 Opening Announcement Al-Curon Programme Summary
3:10 News in Bangla 3:15 Patriotic songs 3:20 Recitation from the Geeta 3:25 Drama Serial: 4:30 Cartoon film: Top Cat 5:00 News in Bangla 5:40 Gostabhi Katha 5:50 Open University 7:00 The News 8:00 News in Bangla 8:45 Package Drama 10:00 News in English 10:25 Mukdadhara 11:30 News in Bangla 11:20 Thursday's programme 11:40 Close down

BBC
6:00am BBC World News 6:10 Newsworld 7:00 BBC Newsroom inc. World Business Report/Asia Today/24 Hours 10:00 BBC World Headlines 10:05 World Focus: Naked City 11:00 BBC World News 2:00 BBC World Headlines 2:05 World Focus: Horizon 3:00 BBC World News 3:30 Time Out: Film '97 4:00 BBC Newsdesk 6:00pm BBC World News 6:15 World Focus: Panorama 7:00 BBC World News 7:15 World Business Report 7:30 BBC Newshour Asia & Pacific 8:30 Time Out: The Clothes Show 9:00 BBC World Headlines 9:05 World Focus: Naked City 10:00 BBC World News 10:30 Time Out: Tomorrow's World 11:00 BBC World News 11:30 Time Out: Holiday 12:00 The World Today 2:00 BBC World Headlines 2:05 World Focus: Dirty Money 3:00 BBC World News 3:30 Time Out: Top Gear 4:00 BBC World Report inc. World Business Report/24 Hours 5:00 BBC World Report inc. World Business Report/24 Hours

CHANNEL V
6:30am Frame by Frame 7:00 Rewind VJ Sophiya 8:00 Frame by Frame 9:00 Jump Start VJ Alessandria 10:00 Frame by Frame 11:00 The Vibe VJ Luke 12:00 Frame by Frame 1:00 By Demand VJ Trey 2:00 Frame by Frame 2:30 First Day First Show 3:00 [V] Live Chandigarh 5:00 Big Bang VJ Alessandria 5:30 Big Bang 6:00pm Rewind VJ Sophiya 7:00 By Demand VJ Trey 8:00



The Clothes Show on BBC World, Tonight at 8:30

Planet Ruby 9:00 The Vibe 9:30 Videocon Mangta Hai 10:00 First Day First Show 10:30 Soul Curry 11:00 House of Noise VJ Luke 12:00m Rewind VJ Sophiya 1:00 Haysah 2:00 By Demand VJ Trey 3:00 Big Bang VJ Alessandria 4:30 V Spot 5:30 Speak Easy

STAR PLUS
6:30 Ninasd 7:30 Star News 8:00

Planet Ruby 9:00 The Vibe 9:30 Videocon Mangta Hai 10:00 First Day First Show 10:30 Soul Curry 11:00 House of Noise VJ Luke 12:00m Rewind VJ Sophiya 1:00 Haysah 2:00 By Demand VJ Trey 3:00 Big Bang VJ Alessandria 4:30 V Spot 5:30 Speak Easy

Sky Business 8:30 Star News 9:00 Sky News 9:30 Aerobics Oz Style 10:00 Ciao Italia 10:30 El TV 11:00 Kate & Allie 11:30 The Oprah Winfrey Show 12:30 To Play the King 1:30 Santa Barbara 2:30 The Bold & the Beautiful 3:00 Men Awax Show 3:30 Bunivaad 4:00 Kya Baat Hai! 4:30 Land of the Giants 5:30 Black Beauty 6:00 Kate & Allie 6:30pm Ciao Italia 7:00

The Great Escape 7:30 Star News 8:00 Small Wonder 8:30 Barbara Guest House 9:00 Tenkatt 9:30 Star News 10:00

Allo Allo 10:30 The X Files 11:30 The Bold & the Beautiful 12:00m Santa Barbara 1:00 Star News 1:30 L A Law 2:30

Picket Fences 3:30 Fantasy Island 4:00 The Oprah Winfrey Show 5:00 Barnaby Jones

STAR SPORTS
6:00am World Cup Hall of Fame-10 6:30 Watersports World-22 7:30 Volvo World Cup Showjumping '96/97 8:30 Dubai Desert Classic Final Day 11:30 Marlboro Asia Pacific Road Racing Champs Hill 12:30 Trans World Sport 1:30 Asia Sport Show-23 2:00 The Asian Football Show-9 3:00 Australia Vs S Africa 1st test Match, Day 5 4:00 Inside PGA Tour 4:30 International Motorsports News 5:30 Volvo World Cup Showjumping '96/97 6:30pm Australia Vs S Africa 1st test Match, Day 5 7:30 ISF World Tour-9 8:00 Asia Sport Show-23 8:30 Indian Football Philips League Air India vs Indian Bank From Bombay 10:30 Spanish F'ball League HL 11:00 Australia Vs S Africa 1st test Match, Day 5 12:00 EPGA Dubai Desert Classic HL 1:00

EL TV
12:30 Hindi Feature Film 1:30 Kinetic Pride Haseen Pal 1:40 Tiger 2:00 Kabhi Ye Kabhi Wo 2:30 Zandu Balm Dance Mania

PTV
8:00am Tilawat Aur Tarjuma/

DD 7
10:30 Janmadin 10:35 Classical Music 11:00 Folk Song 11:15 Adhunik Gaan 11:30 Classical Music 12:30 Monorama Cabin 1:00 Janmabhumi (Serial) 1:30 Ishina (Serial) 2:30 Ato Tranga Bongo Deshe 3:00 Teen Kanaya 3:30 Chirakumar Sava (Serial) 5:05 Nepali Programme 5:30 News 5:35 Chingcham 6:00 Palti Katha 6:30 Amargeeti 7:00 Drama 7:30 Bangla Sambad 8:00 Prasangaki 8:30 Sushastha (Serial) 9:00 Janmabhumi (Serial) 9:30 Monorama Cabin (Serial) 10:00 Bengali Movie Club Film Show 1:00 Closed

SONY ET
8:30 Rangela Re 9:00 The Three Stooges 9:30 Dennis The Menace 10:00 I Dream Of Jeannie 10:30 BSA Star Ki Pasand 11:00 Jeevan Mirtu (Serial) 11:30 Aahat 12:00 The Nirlep Rasoi Show 12:30 TBA 1:00 Pehali Molakal 1:30 The Young And The Restless 2:30pm CMC Matinee-Hindi Feature Film 5:30 The Three Stooges 6:00 Dennis The Menace 6:30 Rangela Re 7:00 Premier 7:30 I Dream Of Jeannie 8:00 Surf-Wheel Of Fortune 8:30 Boogi Woogi 9:00 Shiddhi 9:30 Anarh (Serial) 10:00 Kismet 10:30 O'Maria (Comedy serial) 11:00 The Young And The Restless 12:00 BSA Star Ki Pasand 12:30 Good Shot 1:00 Janekaha Mera Jigar Gaysi Ji 1:30 Surf-Wheel Of Fortune 2:00 Premier 2:30 Closed

WEDNESDAY 5th MARCH
6:30am Frame by Frame 7:00 Rewind VJ Sophiya 8:00 Frame by Frame 9:00 Jump Start VJ Alessandria 10:00 Frame by Frame 11:00 The Vibe VJ Luke 12:00 Frame by Frame 1:00 By Demand VJ Trey 2:00 Frame by Frame 2:30 First Day First Show 3:00 [V] Live Chandigarh 5:00 Big Bang VJ Alessandria 5:30 Big Bang 6:00pm Rewind VJ Sophiya 7:00 By Demand VJ Trey 8:00



Die Hard on Star Movies, Tonight at 10:00

STAR MOVIES
7:30am Oscar Winner — Best Actress: The Song Of Bernadette PG (Hindi Subtitles) 9:30 Classic: The Island Of Lost Souls 15 (Arabic Subtitles) 11:30 Comedy: North 15 (Hindi Subtitles) 1:30 Oscar Winner — Best Actor: Wall Street 15 (Hindi Subtitles) 3:30 Romance: A Perfect Stranger 15 (Hindi Subtitles) 5:30 Oscar Winner — Best Actor: Patton PG (Hindi Subtitles) 7:00 The Movie Show 9:30 Director's Spotlight — John McTiernan: Documentary 10:00 Director's Spotlight — John McTiernan: Die Hard 15 (Hindi Subtitles) 12:00 Film Club: Vigil 18 2:00 Thriller: In Defense of a Married Man 18 (Arabic Subtitles) 4:00 After Dark: Wide Sargasso Sea 18 5:30 Action: Eye Of The Eagle II 15 (Arabic Subtitles)

ZEE TV
5:30 Jagran 6:00 News 6:30 Ghoorna Aaina 7:00 ZED 8:30 Insight 9:00 Disney Hour 10:00 Gaane Anjane 10:30 9 Malabar Hill 11:00 Pakeezah 11:30 Shapath 12:00 Bourvita Quiz Contest 12:30 Hi Zindagi Bye Zindagi

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