CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 General

Detailed experimental investigation was carried out in the open air facility of Department of Water Resources Engineering, (BUET), to investigate the effect of floodplain encroachment on compound meandering channel flow phenomenon. Based on the experimental observations, measurements and analyses, the behavior of compound meandering channel due to various encroachment conditions were envisaged and the corresponding conclusions and recommendations are summarized here.

5.2 Conclusions

The following conclusions can be drawn after summarizing the present study:

- The distribution of flow in a compound meandering channel is affected by the encroachment condition. This study has shown that when an encroachment is placed in a channel, it causes a significant disturbance to the flow for a short distance upstream and for a longer distance downstream.
- Due to placement of encroachment velocity increases at the encroached section of main channel. Velocity at the main channel of encroached section increases almost 2 to 4 times due to placement of encroachment at both sides on bend compare to without encroachment condition for depth ratio 0.375.
- Due to placement of encroachment at crossover velocity also increases at the encroached section of main channel. At this time velocity increases almost 2 to 3 times at the main channel of encroached section due to placement of encroachment at both sides on bend compare to without encroachment condition for depth ratio 0.375.
- For lower depth ratio (D = 0.285) value of velocity are almost for all the encroached section compare to without encroachment condition.
- Percentage of discharge increases on the main channel due to placement of encroachment. But percentage of discharge decreases on the left floodplain of the immediate downstream section at encroached area.
- The velocity profile somewhere shows greater deviation from the logarithmic profile because of meandering effect and interaction between the main channel and the

floodplains. The profile shows that the velocity starts to increase from bed following a zigzag fashion further above towards the free surface. Main channel velocity was found maximum for encroachment on both floodplains of bend.

- For overbank flow shear velocities are lower near the outer bank and maximum near the inner bank of flood plain. The value of shear stress at floodplain is lower than main channel. Shear stress increases at that location when encroachment placed on both side of floodplain at bend and crossover.
- The value of both the energy and momentum coefficient increases due to placement of encroachment. These values are greater when floodplain is encroached at both sides of bend due to non-uniform velocity distribution at the main channel.
- The complex flow pattern for various encroachment conditions was observed through dye tracer technique. The observations were found consistent with the experimental measurements and analyses.

5.3 Recommendations

The present work leaves a wide scope for future investigators to explore many other aspects of meandering channel analysis. Based on this study the following recommendations can be made for future study:

- The study was conducted using with a single slope of the reach. Further studies can be carried out using submerged encroachment or change the length, width of encroachment for better understanding of the phenomena of the compound meandering channel.
- The experiment was carried out for rigid bed condition. Similar experiment can be conducted for mobile bed condition.
- The present study does not represent any particular river problem and only deals with laboratory cases. This study may be applied for a particular alluvial river to assess the applicability for field situation.
- Further investigation is required to study the flow properties and to develop models using numerical approaches.