

Effects of Floods on Communications.

(a) Roads.

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A communication system is naturally planned to allow users to have an unobstructed and smooth passage between places which the system serves. The highway users then become accustomed to the conveniences so provided and a certain trend of economic activity develops around the highway. As increased facility is begun to be derived by the use of a road, the more dependent becomes the life of the area on such a road. If on any occasion, the facility of easy flow of traffic is denied to that area it greatly affects the settled pattern of behaviour of the people and upsets their normal mode of life. This becomes more pronounced when the highway or the net-work of roads gets damaged or submerged by flood. For, at this time, not only the normal requirements are being denied but the abnormal needs arising at the moment to provide relief to flood affected areas, patrolling important installations and rescuing marooned population become entirely impossible to be attended to, thus creating a sense of utter helplessness.

This type of catastrophe or disaster has begun to happen regularly in different areas of the Province from a decade. Every year there are certain parts of the country where communications are dislocated due to spilling of rivers and streams during the rainy season. What are the causes and what should be the remedy? This is a question which cannot be isolated and has a direct bearing upon the general problem of the cause and effect of flood as a whole.

It is natural for a road to cross a drain, a stream or a river in its alignment and layout. It now depends on the importance and the state of development of the area through which a road is passing to ask for a certain type of safe crossing over such cross drainages. When the economy of the area is primitive and the need for the use of a road occasional, the traffic can remain suspended during floods or occasional heavy rains. But as soon as human activity in that area begins to increase, it becomes necessary to decrease the time for the traffic to remain suspended and better cross drainages are demanded. For a developed area, a communication system which has to serve as the main artery should have a road with safe stream or river crossings which would function and allow traffic to pass even when the drainages are in high flood. Such a system then brings confidence of movement and the

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trade and business activities dependent on such safe movement begin to develop and expand on sure grounds. But the past decade has proved that no such confidence can be reposed on the communication system in this Province.

What has happened? Have the activities and stir in our national development made us realize this fundamental need, or, has the pattern of natural equilibrium over a long period changed? While our main communication systems were considered safe and reliable in the past, these have now become inadequate. The answer lies both ways. The need for a better and more adequate road system has increased and the flood pattern of the past decade has made this realisation more acute.

Our main roads have sufficient cross drainage works to cater for the normal pattern of flood discharges experienced over a long period. It was therefore natural economics to provide for the normal and to take into account any abnormality that may arise after a long period. But when the abnormal behaviour insists to become a normal habit, this has to be given due consideration and this is exactly what has happened now.

Many factors not normal have come into operation in affecting the usual disposal of flood of a certain basin and accentuating its intensity and diverting the course. This has already been discussed by other learned participants in this symposium. But it may be added that the Irrigation system developed in recent years has also disturbed the normal course of disposal which the communication system could not take into account. Recent experience with floods of high magnitude or duration has brought this fact home that floods of certain major basins have been diverted to smaller basins or streams by breaching in irrigation canals or cuts made in marginal bunds to save a headwork. Sometimes the abnormal run off due to extraordinary rain has been checked by embankments storing and turning them into floods. It therefore naturally raises the question of more coordination in determining the method of disposal of a certain flood between the various agencies so that adequate provisions can be made in their works for such eventualities.

In certain areas of the Province, the road runs close to a big drainage. It remains safe and dry during years of normal behaviour of the drainage, but in abnormal periods when the spill is more widely spread the road gets submerged or affected by the rise of water level and breaches occur of small magnitude. Such roads had originally been laid out as a part of the minor communication system to serve the small needs of the areas. But with the Development of that area or the adjoining areas, the need for a better road increased and this demand has been fulfilled in many cases by adhering to the same old alignment and improving only the surface of the road. The submergence or effect of

abnormal floods was in some way not taken into consideration. With experience now gained it would be better economics to look into this aspect and rectify any such defect.

Expenditure in restoring a flood damaged road has not been the primary factor which has drawn our attention to the seriousness of the problem. It is the catastrophe which suddenly descends on the entire part of the country shattering the normal life pattern and disrupting the established trade; alongwith the helplessness felt in rescue operation and relief measures. It takes weeks to allow movement of traffic under certain limitations; and months to restore the movement to the normal pattern. To restore the normalcy and repair the damages, the purse string of the exchequer naturally looses and heavy financial burden is borne which during normal period is denied for taking any preventive measures. For roads affected by floods about Rs. 50,000,000 have been spent on the restoration of such damages during a period of ten years of our existence. This might normally have allowed construction of about 800 miles of new metalled and tarred road.

This colossal expenditure on repairing damages to floods and eliminating inconvenience and dislocation to traffic has to be prevented. Now could this have been done previously? Realisation of such happenings was not quite possible in the past few years. For until and unless things begin to happen in any pattern, there is no basis of probability. Now the results are before us and it will be wise to provide for such eventualities and minimise the chances of disruption of communication and heavy flood financing.

But the problem of safe-guarding communication against abnormal recurring floods cannot be singled out for solution. There may be certain roads which can be studied independently as to their layout and the measures to be adopted for safe-guarding against flood damages but many of the roads in the Provinces run by the side of canals, near the headworks and along the railway embankments and in many cases downstream of these structures. Unless all these agencies, affected by such abnormal happenings, do not take stock of things together the solution will remain indeterminate.

Most of the roads in the Province have been affected during floods by the concentration of water at places where no natural drainage exists and at places where it does, it is not capable of the extraordinary discharge that is diverted for it to carry. The factors leading to such behaviour are many. Anyway these lead to serious breaching of the embankments of roads and washing away of long lengths of berms downstream of the flow. Simultaneously the metalled edges are exposed and undermined. The subgrade becomes wet and persists to remain so for a long time, rendering the subgrade incapable of carrying any load. Surrounding flooded areas take a long time to drain out and dry up. Restoration of traffic becomes a tedious process.

Though makeshift arrangements are made to transship human beings and animals through such breaches and gaps by boats, bailey bridges or by allowing them to wade through knee deep slush, the wheeled traffic has to remain suspended until diversions could be provided along breaches or berm edges restored and pocket scours temporarily filled up. Still the speed and load carrying capacity has to be kept under certain limits over vast length of saturated subgrade to prevent as much damage to the road surface as possible. Normally small breaches or cut offs are easy to restore, but big breaches take a long time to negotiate. The standing water has to be removed and the ground dried to provide diversion. The actual breaches even take two to three months to be restored when dry soil is available. The whole affected length requires resurfacing.

The damages to road surface are many. But often big discharges in small drainages undermine the culverts and bridges provided on these streams due to diversion of abnormal discharges of other basins. Bridges on streams, as Rohi or Deg and the like, have been washed away in this manner. Functioning for quite a long period under usual conditions, these could not cope with the extra discharges let into these streams. Many such cases have to be carefully examined to provide measures for saving these structures in future floods of these types. Breaching sections close to these bridges might be possible to cope with extra run off in the abnormal flood.

With the experience now gained in various cases, the department is alive to the problem and necessary measures are being adopted to allow these excess discharges through new road structures. Each and every such breach is examined to see the possible future action and to provide low causeways, dips or regular culverts and bridges. These measures will to a great extent help relieve the pressure now being felt due to abnormal floods and will save roads from being damaged.