

Analysis on Difference in the State of Catch Basin According to Whether Roads are Flooded / Non-flooded

NAKAMURA Yumi, Research Engineer; IWASAKI Hirokazu, Head; MATSUURA Tatsuro, Senior Researcher; KONDO Hiroki, Guest Research Engineer
Wastewater System Division, Water Quality Control Department

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1. Introduction

Some cases were reported where accumulation of fallen leaves in catch basin or on basin cover or gutters decreased the drain capacity of catch basin and caused road flooding or inundation damage near the road. It is known that the rainwater fall rate of catch basin cover that affects drainage of catch basin varies according to type of basin cover, gutter flow rate, and cross / longitudinal slope of the gutter¹⁾, but effect of accumulated fallen leaves on drainage of catch basin is not clarified.

We therefore analyzed effect of accumulated fallen leaves on drain capacity of catch basin for the roads ever flooded by comparing the amounts of fallen leaves in catch basin and on basin cover and gutters for sections ever flooded ("flooded section") and sections never flooded adjacent to or facing flooded sections ("non-flooded section").

2. Outline of the survey

We conducted a field survey on catch basins with focus on accumulated fallen leaves and a hearing from road administrators and selected two routes (Municipal road A, National road B) from flooded roads. Main survey items are accumulation of fallen leaves on basin cover and gutters, diameter of pipes in the basin, and coverage ratio of pipe openings (ratio of the area of pipe openings covered by fallen leaves in basin to the area of pipe openings). The survey period is from December 2015 to January 2016, when fall of leaves was coming to an end.

3. Survey results

As accumulation of fallen leaves on basin cover and gutters, we organized the data on the weight of accumulated fallen leaves per meter (Total weight of accumulated fallen leaves (kg) / Total extension of the survey section (m)) (Fig. 1). Figure 1 shows that the accumulation of fallen leaves was larger in flooded sections than non-flooded sections by approx. 6.6 times in Municipal road A and approx. 1.4 times in National road B.

Next, in order to check the accumulation of fallen leaves in basins, we organized the data on the average coverage rate of basin pipe openings for flooded and non-flooded sections ("average coverage rate") (Table 1). In Municipal road A, fallen leaves have not accumulated up to pipe openings in flooded sections, while average coverage rate reached about 50% in non-flooded sections. In addition, average coverage rate was not less than 80%

in both flooded and non-flooded sections in National road B.

4. Consideration and future schedule

The survey results show that coverage rate is not higher in the flooded sections than non-flooded sections and suggest the possibility that the accumulation of fallen leaves in the basin may not affect decline in drain capacity. Since the accumulation of fallen leaves on basin cover and gutters is larger in flooded sections than non-flooded sections in both routes, fallen leaves on basin cover and gutters may have prevented drainage.

It is therefore important to grasp the effect of accumulation of fallen leaves on basin cover and gutters against drain capacity. Accordingly, we are conducting an experiment with a real-scale model to study how the accumulation of fallen leaves on basin cover and gutters affects the fall rate of catch basin cover by changing the type of basin cover, flow rate corresponding to rainfall, and road incline.

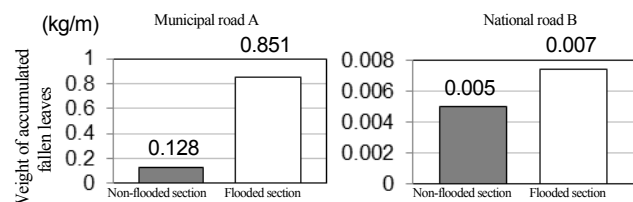


Fig 1. Weight of fallen leaves accumulated on basin cover and gutters

Table 1. Average coverage rate of pipe openings in the basin Rate

	Municipal road A	National road B
Non-flooded section	47.5%	85%
Flooded section	0%	100%

1) "Experimental study report on the fall efficiency of rainwater of road drain basin cover" Public Works Research Institute, No. 3341, Jan. 1995