

Analysis of Example of Revegetation Evaluation Result on Cutting Slope Revegetation Measures in Expressway : Focusing on Cheonan

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INTRODUCTION

- In General, the Slope Revegetation Process is Selected on the Site According to 'Road Slope Revegetation Design and Guidelines' (2009) by the Ministry of Land, Transport and Maritime Affairs, by Running a Pilot Project Every 10km and Monitoring at least 3 Times.
- In This Study, We Would Like to Introduce a Case of Testing, Monitoring, and Evaluating the Vegetation Material Hydroseeding(VM), Soil Fiber Hydroseeding(Soil Fiber), and GMP(Green Protecting Method for Multi-Planning on Cutting Slope) for a Ripping Rock Slope in Section 1(Asan-Cheonan Construction Project).

CONTENTS OF STUDY

• Material and Methodology

• Method of Survey : Revegetation Pilot Project was Initiated in September 2017. Field Surveys were Conducted Three Times in Total, in December 2017, August and November 2018.

• Personnel and Equipment

Equipment Plan		Labor Plan	
Equipment	Unit	Staff	Person
Generator (50 Kw)	1	Landscaping	1
Truck-mounted Crane (5 Ton)	1	Hydroseeding	1
Air Compressor (21 m ³ /MIN)	1	Rock Drill	2
Hydroseeder (25 HP)	1	Special Worker	1
Water Tank (5500 L)	1	Ordinary Worker	2
Total		Total	

• Seeds Sowed for Each Measures

Category	Name	Seeds Sowed (g/m ²)	Blending Ratio
Native Woody Plants	<i>Lespedeza cyrtobotrya</i> Miquel	4.0	30%
	<i>Indigofera pseudo-tinctoria</i> Matsumura	3.5	
Subtotal			30%
Native Herbs	<i>Lespedeza cuneata</i> G. Don	4.0	50%
	<i>Lotus corniculatus</i> Linne var. <i>japonicus</i> Regel	2.0	
	<i>Centaurea cyanus</i> Linne	2.0	
	<i>Coreopsis drummondii</i> Torrey et Gray	2.0	
	<i>Cosmos bipinnatus</i> Cavanilles	2.5	
Subtotal			50%
Alien Herbs	<i>Festuca arundinacea</i> Schreb	3.0	20%
	<i>Lolium perenne</i> L.	2.0	
Subtotal			20%
Total			

• Results and Discussion(I)

• Physical and Chemical Properties of Soil

Items	Acceptable	Section 1: Ripping Rock Slope
Acidity (pH)	6.0-8.0	6.1
Organic Matter, OM (%)	> 3.0	1.51
Total Nitrogen, TN (%)	> 0.06	0.05
Effective Phosphoric Acid (mg/kg ¹)	-	76.41
CEC (cmol/kg ¹)	> 6.0	5.88
EC (dS/m ¹)	< 1	0.13
Soil Hardness		5.8

• Surveying Plant Species of Each Revegetation Measures

Category	Name	VM	Soil Fiber	GMP
Native Woody Plants	<i>Lespedeza cyrtobotrya</i> Miquel	●	●	●
	<i>Indigofera pseudo-tinctoria</i> Matsumura	●	●	●
Subtotal		2	2	1
Native Herbs	<i>Lespedeza cuneata</i> G. Don	●	●	●
	<i>Lotus corniculatus</i> Linne var. <i>japonicus</i> Regel	●	●	●
	<i>Centaurea cyanus</i> Linne	●	●	●
	<i>Coreopsis drummondii</i> Torrey et Gray	●	●	●
	<i>Cosmos bipinnatus</i> Cavanilles	●	●	●
Subtotal		5	5	5
Alien Herbs	<i>Festuca arundinacea</i> Schreb	●	●	●
	<i>Lolium perenne</i> L.	●	●	●
Subtotal		1	2	1
Total		8	9	7

• Results and Discussion(II)

• Assessment for Revegetation Test Site for Cutting Slope

Category	Assay	Items	Marks (%)	Cutting Slope			Criteria & Methodology	
				VM	Soil Fiber	GMP		
Material	Qnt.	Soil & Seed Quality		-	Accept	Accept	Accept	Vegetative materials sampling
		Total Fractional Vegetation Coverage (FVC)	Mainly Herb Herb-Woody Plant Mix	15	15	15	Whether FVC goal is achieved	
Plant Growth	Woody Plant Community Restored Scenery		15				Occupancy of alien herbs in FVC	
	Quality	FVC (Alien Herbs such as Cold-weather Alien Herbs)	Plant Growth (Excluding Cold-weather Alien Herbs)	0	0	-3	Relative evaluation of samples for each process	
Pest			5	5	5	5	Presence of pests and diseases from time to time until the growth judgment period	
Quality	Number of Species Discovered	Number of Grown Trees	10	10	7	7	Number of grown trees for vegetation growth	
		Number of Herbs/Woody Plants Discovered	15	10	15	10	Number of species discovered (herbs/woody plants) for vegetation growth	
Quality	Physicochemical Properties of Vegetative Material	Invasive Species	(0-5)	0	0	0	Existence of invasive species	
		Dropout & Collapse	10	7	7	7	Measurement of soil hardness, acidity and humidity	
Qual.	Vegetation Persistence & Invasion Likelihood	Dropout & Collapse	5	5	5	5	Number of dropouts & collapses every 10 m ²	
		Vegetation Persistence & Invasion Likelihood	5	3	3	3	Vegetation persistence & succession on previous project sites (data review and case study)	
Feasibility	Qnt.	Similarity to Surrounding Environment	(0-5)	0	0	0	Evaluation on similarity to the surrounding environment	
		Construction Cost	30	30	30	30	Initially invested construction cost	
Total			100	90	92	84		

CONCLUSIONS

- Analyzing the Physical and Chemical Properties of the Soil on the Cutting Slope(Ripping Rock Slope) for the Asan-Cheonan Construction Project, it was observed that the Soil had a Low Content of Nutrients as it Showed Low Levels for Organic Matter, Total Nitrogen, Effective Phosphoric Acid, and Cation Replacement Capacity.
- All of VM, Soil Fiber and GMP Marked more than 75 Points and were Selected as the Revegetation Process Applicable to the Construction Site of Section 1.

