

Construction Site Erosion

- Although this represents a relatively small area it can have significant impacts
 - Erosion on construction sites can be 100 times greater than on Ag Lands
 - Steep slopes
 - Highly disturbed
 - Often subsoil with limited aggregate stability to resist erosion

Construction Site Erosion

- On-site problems result in additional grading to correct severe erosion
- Sedimentation may alter site drainage and obstruct engineered systems
- Severe erosion can cause difficulty with revegetation
 - Loss of topsoil reduces productivity
 - Lost organic matter and nutrients
 - Poor aggregation can result in compaction
 - It is often difficult to grow plants in topsoil

Construction Site Erosion

- Off-site problems associated with sedimentation and nutrient contamination of water bodies
- Sediment build up in stream channels reduce flow capacity
- New buildings and paved surface increase runoff
- Combined these factors increase the frequency of flooding.

Evaluating Erosion Control Practices for Construction Sites

- The Revised Universal Soil Loss Equation (RUSLE) can be used to estimate erosion and evaluate management options
- Benefits of cover management can be estimated by altering the C factor
- Support practices such as straw bales, silt fences, gravel bags, narrow grass strips or buffers, vegetative barriers, terraces and diversions can be evaluated with the P factor

Erosion From a Road Bank



Table 1. Effects of management practices on controlling erosion on a road bank. Estimated sheet and rill erosion and sediment yield using RUSLE during a construction year in Nashville, TN¹.

<u>Site Conditions²</u>		Soil Loss from Road Bank (t/a/y)	Sediment Yield at Base of Slope (t/a/y)
-1 st 6 mo	2 nd 6 mo		
Bare	Bare	400	400
Bare	Bare, Silt Fence	400	250
Bare	Mulch, Seeded	140	140
Bare	Sod, Diversion	40	5

¹Effects of management will vary under other climatic conditions. For example, soil loss and sediment yield will be 35 % and 80 % less in Chicago and Denver, respectively, than values shown in table.

²Roadside cutbank, 100 ft. long at 30% gradient. Site disturbed from March – June. Soil loss and sediment yield during a single construction season. Soil is a silt loam. Silt fence placed at base of slope. Diversion placed in middle of slope.



Principles of Construction Erosion Control

- Divide project into small phases, clearing small areas of vegetation
- Schedule excavation during low rainfall periods
- Fit development to the terrain
- Excavate immediately before construction instead of leaving soil exposed for extended period
- Divert water from disturbed areas

Principles of Construction Erosion Control

- Cover disturbed soils as soon as possible with vegetation or mulch
- Control concentrated flow to prevent the formation of rills and gullies
- Minimize length and steepness of slope (bench terraces)
- Prevent sediment movement off-site (silt fence, hay bales)
- Avoid compaction by restricting traffic to limited areas (maintains infiltration)

Factors to Consider When Selecting Species for Revegetation

- Climate
- Soil Condition
 - Productivity
 - Fertility
- Season
 - Cool season vs warm season plants
- Rate of emergence
- Need for rapid canopy cover
- Similar considerations for cash crops but goal is rapid and complete establishment of surface cover

Factors to Consider When Selecting Species for Revegetation

- May consider rapidly growing nurse crop planted with perennial cover
- May consider interseeding legumes
 - Construction site soils generally have low organic matter and N.
- Sod provides the most effective revegetation and erosion control but can be costly

Factors to consider when selecting species for revegetation

- For revegetation in the fall consider planting a cereal grain such as rye or wheat with a winter legume
- Then over seed with perennial warm season in the spring.
- During summer months consider a warm season annual like crabgrass

Factors to consider when selecting species for revegetation

- Mulch could be used to cover soil during seasons where crops are difficult to establish but rapidly growing plant cover is much more effective
- Growing plant provides an anchored surface cover and improves porosity/infiltration

Compaction of Urban Soils

- Causes:
- Heavy construction Equipment
- Aggregated top soil is often lost or removed leaving subsoil with low aggregate stability which is more easily compresses
- Human traffic
 - Turf damage decreases root growth allowing for compaction

Compaction of Urban Soils

- Management options:
 - Replace subsoil with topsoil
 - Increase organic matter with
 - residue management/no-till systems
 - Cover crops
 - Over seed warm season lawn with cool season grass
 - Mulch, compost, manures, etc.
 - Annual aeration of turfgrasses
 - Irrigation Management
 - Frequent low rates because compacted soils hold little water
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