

Sumatra, 9 E - 29190 Malaga (Spain) www.aplitop.com Tel: + 34 95 2439771 Fax: + 34 95 2431371



Technical Note (tcpmdt_es_v75_sec001_DefinitionOfReinforcements)

Definition of Reinforcements

Date of Update:

12/08/2015

Requirements

MDT Version: 6.5 or higher. CAD: AutoCAD / BricsCAD / ZWCAD. Operating System: Windows XP / 7 / 8 / 10.

<u>Purpose</u>

Definition of a road making use of the existing roadbed.

As a starting point we have a surface with an existing road where the purpose is the definition of a new road making use of the existing road in the intersecting areas of both roads.

This technical note will describe all the steps required to define a cross-section with reinforcements.

Details

The first step is to open the REINFORCEMENT drawing.



We then import the horizontal alignment of the new road by executing the **MDT7** > **Horizontal Alignments** > **Import Horizontal Alignment** command and selecting the EJEPRINCIPAL.EJE. file.

The next step is to generate the cross-sections of the natural terrain by executing the **MDT7 > Cross-Sections > Obtain Profiles** command, placed every **5 metres** and with a width to the left and right which is sufficient to enable the development of the cross-section, in this case we will define a width of **15 metres** on both sides. We will call the cross-section file EJEPRINCIPAL.TRA.

Perfil Transversal	×
Superficie D:\\Ejemplo05\re	fuerzo.SUP
<u>Fichero</u> D:\\EjePrincipal.T	RA
Origen Distan	cias Configuracion
P.K. Inicial 0.000	Muestreo
P.K. Final 870.839	Distancias
Longitud Perfil (mts)	Intersección con Ejes
Izquierda 15.000	Intervalo 5.000
Derecha 15.000	Distancias Curvas 5.000
Líneas de corte	Primer P.K. 0.000
Extremos	Avanzadas
Ortar	Sentido
Repetir	Oirecto
Interpolar	
Opciones	O Inverso
Aceptar	Anular Ayuda

Definition of Segments

Once the cross-sections have been generated we need to create the segment, whereby this technical note already features the remaining elements of the road, or in other words, the longitudinal profile, the vertical alignment and the standard cross-section. We then execute the **MDT7** > **Segments** > **Define** / **Edit** command, calling the new segment REFUERZO.SEG and then import the different components of the same from the project folder: EJEPRINCIPAL.EJE, REFUERZO.LON, EJEPRINCIPAL.TRA, REFUERZO.RAS AND REFUERZO.SCC.

omponentes					
Elemento	Fichero	PK Inicial	PK Final	Fecha	
EJE	EjePrincipal.EJE	0.000	870.839	22/10/12	
LONGITUDINAL	refuerzo.LON	0.000	870.839	22/10/12	
TRANSVERSALES	EjePrincipal.TRA	0.000	870.839	21/05/14	Ξ
RASANTE	refuerzo.RAS	0.000	870.839	22/10/12	
SOBREANCHOS					
SECCIONES	refuerzo.SCC	870.839	870.839	21/05/14	
PERALTES					
BLOQUES					-
Importar	Automático	Designar	Exportar	Borrar	
Ver / Editar	Ver / Editar		Recalcular	Avanzadas	
pciones		Vista Previa			
Verificar	No Generado				
Revisar	Cubicación		\sim	7	
Dibujar	Modificado				
/ista en Planta	Exportar Cajeo				
Informe	,	<			

The preview of the segment illustrates the delimitation of the road on which we are going to make use of the roadbed.

Definition of the Reinforcement

Once the segment has been defined we then alter the standard cross-section taking into consideration the existing roadbed in order to make use of the same.

The first step is to execute the **MDT7** > **Cross-Sections** > **Define** / **Edit**, command, select the REFUERZO.SEG segment and click on the "**Reinforcements** – **Others**" tab.



We then click on the "**Reinforcements**" box and set tolerance values of **-0.5** and **0.5** metres for **Minimum Difference** and **Maximum Difference** respectively. As the aim is to make full use of the existing roadbed we then select the "**Adapt to Terrain**" box.



Finally, we need to indicate the new road where the existing road is located, by clicking on the "**Designate Polylines**" tab and in this case selecting the two polylines which define the boundary of the area of ground.



Automatically, if we go through the different existing stations we will see that certain stations feature two red marks indicating the point at which the road to be made use of passes through and how the standard cross-section adapts to the existing roadbed.

	~~		P.K	15.000	ZI= 542.3	38	>>>		Vial de Refere	ncia
	.14.0 .12.0	-10.0		£.0 -4.0		0.0 2.0		6.0 8.0	10.0 12.0	14.0 16.0
44.0										
42.0		JE	-			₩	_			
58.0 										
lataformas Fie	mes Cunetas Desm	ionte Ten	apilin Salva	iguarda Muros-	Estructura	Geologia R	eluerzo - Otros			
_			Canil 2	Carri 1		Ejo	Canil 1	Canil 2	Arcén Exteri	и
P.K.	Arcén Exterior								0.000	
P.K. 870.839	Arcén Exterior 2.500	_	3.500	3.500			3.500	3.500	2500	
P.K. 870.839	Arcén Exterior 2.500		3.500	3.500			3.500	3500	2900	

We may then draw the segment using the **MDT 7 > Cross-Sections > Draw Cross-Sections** option, selecting the REFUERZO.SEG file. The drawing clearly illustrates the use of the raodbed conducted in certain stations.

A. D D B B B A S - 0 - 1	💮 Dibujo y anotación 🔹 💌	refuerzo.dwg	Escriba palabra clave o frase	🏦 🔔 Iniciar sesión 🔹 🗶 💩	• • • • ×
Archivo Edición Ver Inse Inic Inserción Anotar Presentación	rtar <u>F</u> ormato <u>H</u> err. <u>D</u> ibujo A Paramétrico Vista Administrar	<u>c</u> otar <u>M</u> odificar <u>P</u> arametrico Salida Módulos de extensión	Ventana <u>r</u> MD17 Autodesk 360 Aplicaciones destacadas	۰.	- B' X
Linea Politinea Circulo Arco	+2 Desplazar O Girar ✓ ✓ Copiar ▲ △ 67 Estirar Escala 88 ●	Estado de capa no guardado ♀ ☆ 🖞 ■ PERTRAN-TEXTO	A A III Inserción	PorCapa + PorCapa + Grupo & Ba	Medir B Peper
Dibujo *	Modificar •	Capas 💌	Anotación 👻 Bloque 💌	Propiedades • u Grupos •	Utilidades 🕶 Portapapeles
[-][Superior][Estructura alámbrica 2D]					
21-542/05 2-54201 22-54205		INTERNA DISTANCE IN STREET		In-INC. De-INC. In-INC.	199
and and and	P.K.=30.000	and areas and	P.K.=105.000	Nerve Indian Traini	
	6				s
25454438 (27454838 (247544839 2646393 (247,723 (246)88	P.K.=35.000	21-222-473 D-222-481 Der-222-473 Dereille De-2024 D-4180	P.K.=110.000	Decide Decides Decides	SCU 70
Designandi Designan Designandi Designa Tanashi Designa	P.K=40.000	Tanggang langgang lan-sing ang langgang lang	P.K=115.000	Zanamana 2-100 Ne Ta-100 Na Denimi Gentina In-100	P.K=190.000
		_ 			
Ziertel Die Zweist Auf Zuweistens Die Talle Geweiser Die Gall	PK=45.000	Zandinana Zunita 273 Zandatiana Denian General Duri an	PK=120.000	Juditingen Juditinger Tauditingen Gunzten Lauffens zundass	P.K.=195.000
20-645.905 2-444.04 20-685.905 26-488.0 50-7886 20-6880	P.K.=50.000	Zhadhana Juadha Xia Jua-Olaana Dhadhan Jaarana Tuadadi	P.K.=125.000	ZI-WERKEN 3-WERKER 22-WERKEN SI-WERK SI-WERKE 1-4008	P.K.=200.000
Y					
	X 🔧 🔀 "p <u>Sceptber</u> yon comando	To-State 5 - State 1, - State 5	P.K=130.000	Indexes Southeast Toronto State	P.K.#205.000
376944 1577, 4065731.2235, 0.0000 +	.	16-0-		MODELO 🔝 😐 🙏 1:1 * 🎊	A 🖸 🗗 😏 🐺 🖓 🗖

To end, we can obtain a list containing the surface and volume of reinforcement by executing the **MDT7** > **Volumes** > **Measurement of Roadbeds** command, select the REFUERZO.SEG segment and click on the window with the data on the initial station and final station which appears by default.

PK	L.B.I.I.	L.B.I.D.	L.B.E.I.	L.B.E.D.	S.CALZADA	S.ARCÉN I.	S.ARCÉN D.	VOL.FIRME	S.REFUERZO	VOL.REFUERZO	Sup.Ref.Rod.	
0.000	0.000	0.000	5.000	5.000	70.000	12.500	12.500	80.800	0.000	0.000	0.00	
	0.000	0.000	5.000	5.000	70.000	12.500	12.500	80.800	0.000	0.000	0.00	
5.000	0.000	0.000	5.000	5.000	70.000	12.500	12.500	80.800	0.000	4.021	0.00	
	0.000	0.000	10.000	10.000	140.000	25.000	25.000	161.600	0.000	4.021	0.00	
10.000 0	0.000	0.000	5.000	5.000	70.000	12.500	12.500	60.818	1.608	8.010	35.03	
	0.000	0.000	15.000	15.000	210.000	37.500	37.500	222.418	8.042	12.031	35.03	
15.000	0.000	0.000	5.000	5.000	70.000	12.500	12.500	60.754	1.596	7.952	35.03	
	0.000	0.000	20.000	20.000	280.000	50.000	50.000	283.172	16.020	19.983	70.08	
20.000	0.000	0.000	5.000	5.000	70.000	12.500	12.500	60.703	1.585	7.896	35.03	
	0.000	0.000	25.000	25.000	350.000	62.500	62.500	343.875	23.947	27.879	105.09	
25.000	0.000	0.000	5.000	5.000	70.000	12.500	12.500	60.636	1.573	7.838	35.03	
	0.000	0.000	30.000	30.000	420.000	75.000	75.000	404.511	31.811	35.717	140.12	
30.000	0.000	0.000	5.000	5.000	70.000	12.500	12.500	60.588	1.562	7.784	35.03	
	0.000	0.000	35.000	35.000	490.000	87.500	87.500	465.099	39.623	43.502	175.15	
on aitud Pa	nda latar	ior Innuised:			TOTAL	ES						
ongitud De	inda Inter	ior Derecha										
ongitud Ba	inda Inter inda Evta	rior Izquierd									97	
ongitud Ba	inda Exte	rior Derechu	a								88	
unerficie d	le Calzad		-								1219	
uperficie à	rcén Iza	ierdo								2188		
uperficie A	rcén Der	echo								2201 2		
'olumen de	Firme										1327	
uperficie d	e Refuer:	20									560	
olumen de	Refuerzo)									560	
unerficie d	e Bodadi	ura de Befu	erzo								818	

After conducting the calculation process the following list will appear featuring the different items, including the reinforcement surfaces and volumes.

References

- 1. Example data files
- 2. Help:

Definition of sections Generation of cross-sections Definition of segments

3. Video