

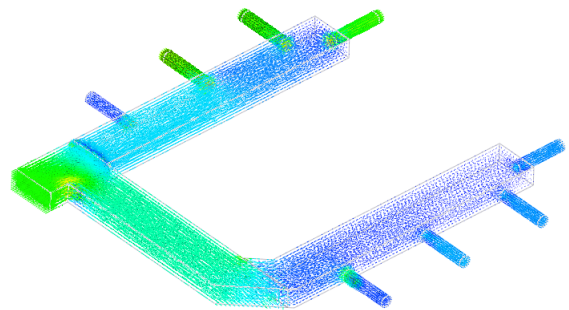
MIDAS CFD分析

多孔板計算和驗證

台灣邁達斯

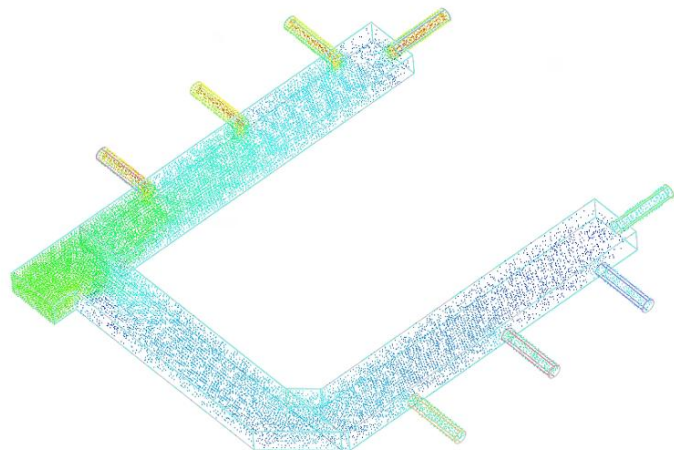


• Part1_實體模型解析法



• Part2_多孔介質模型法

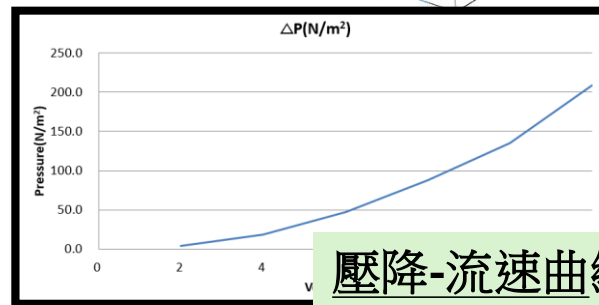
- 2.1 P-V Curve Analysis
- 2.2 P-V Curve Verification
- 2.3 多孔介質模型法



2.1 P-V Curve Analysis

P-Q Curve Analysis

量測點A
(管道短邊相等的距離處)

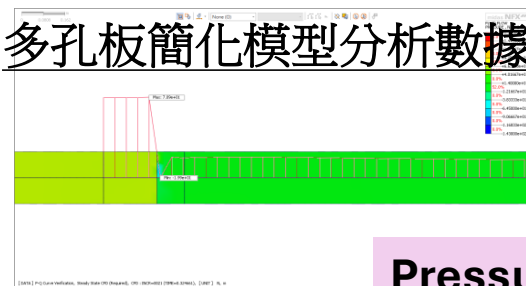


壓降-流速曲線

量測點B
(管道短邊一半的距離處)

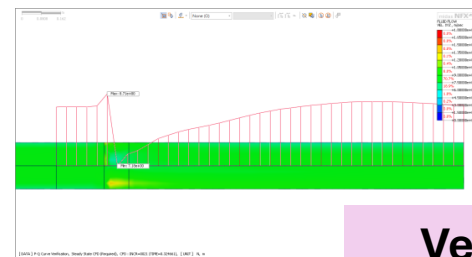
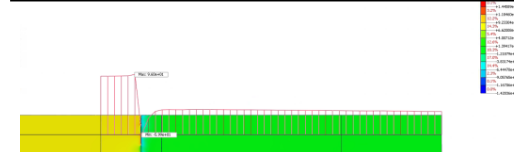
2.2 P-V Curve Verification

多孔板簡化模型分析數據

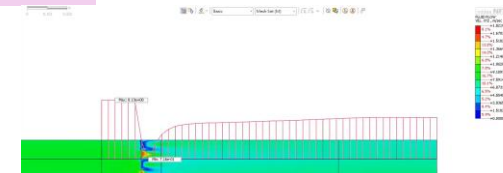


Pressure (N/m²)

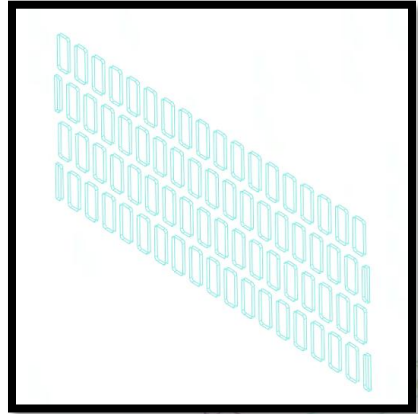
多孔板詳細模型分析數據



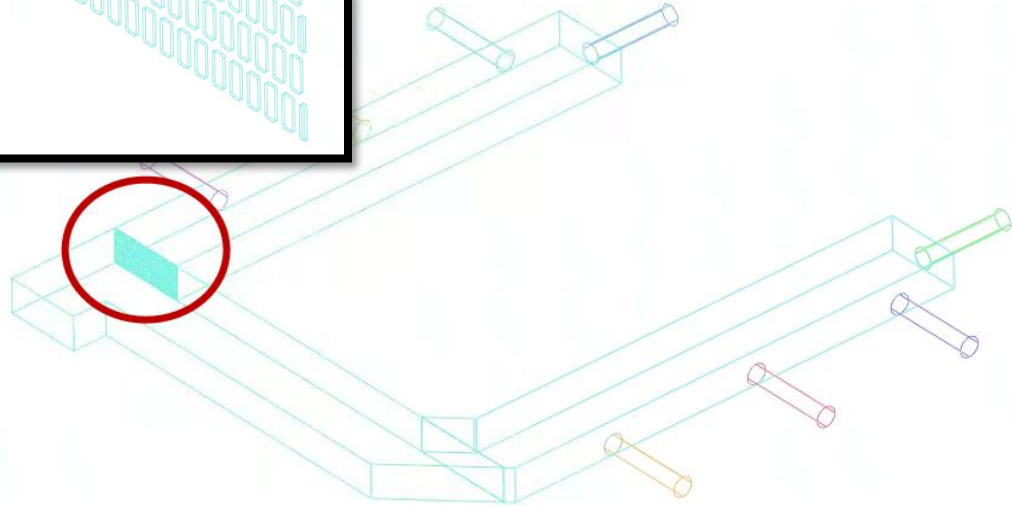
Velocity (m/sec)



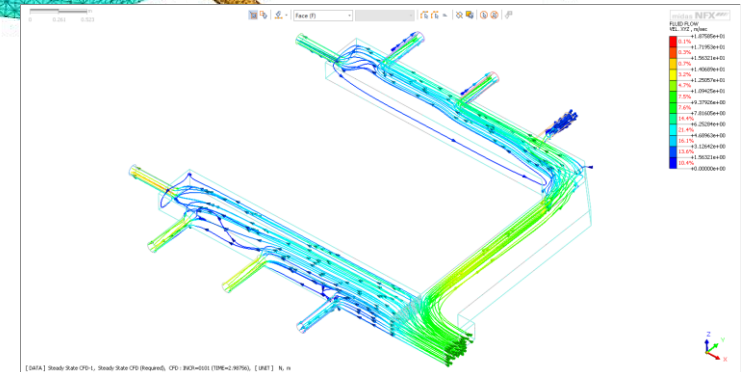
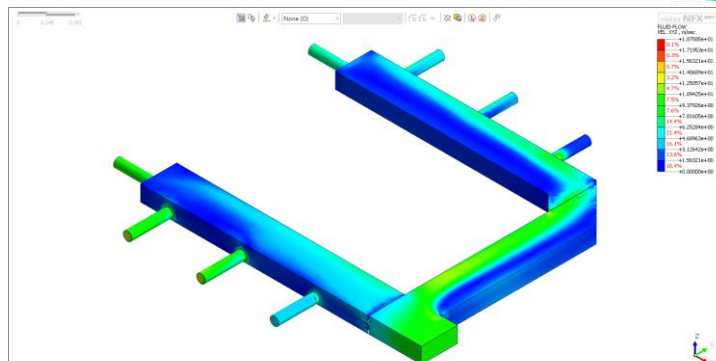
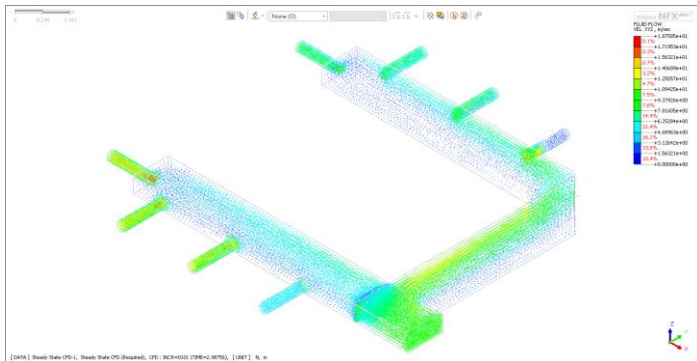
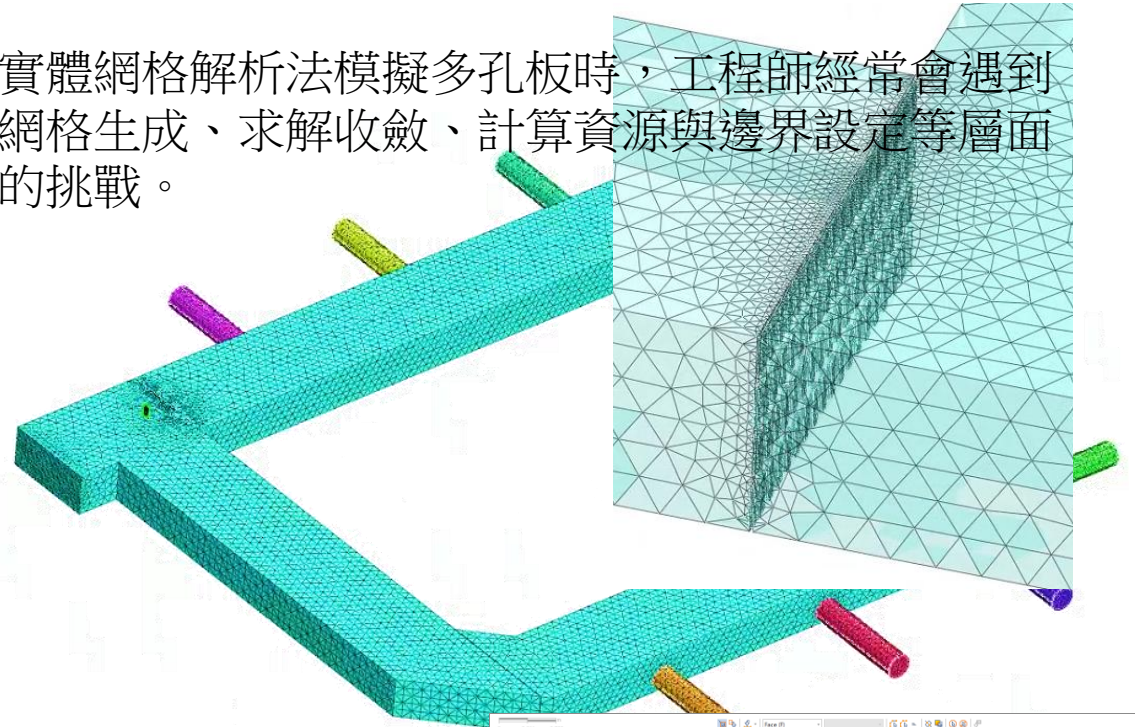
Part1_實體模型解析法



多孔導流板的主要功用是透過人工製造均勻的局部壓降，強制重新分配流場，達到整流、均勻化與抑振的效果。

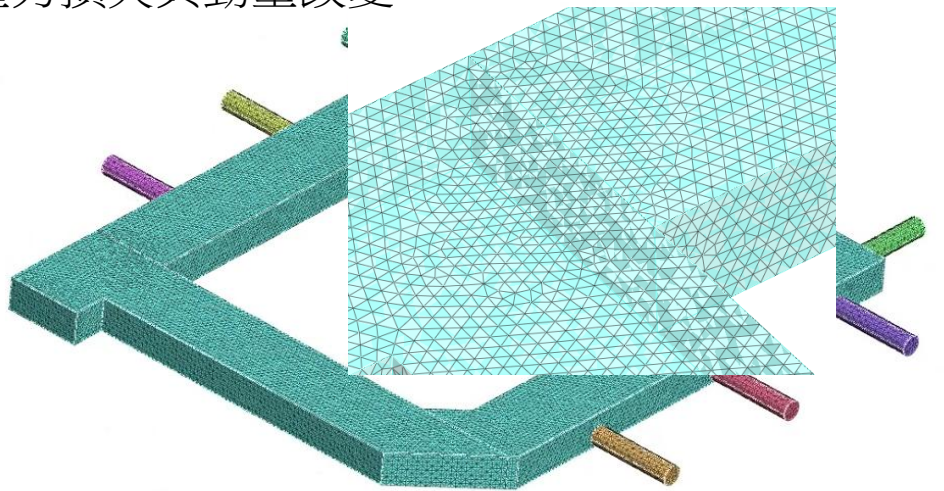
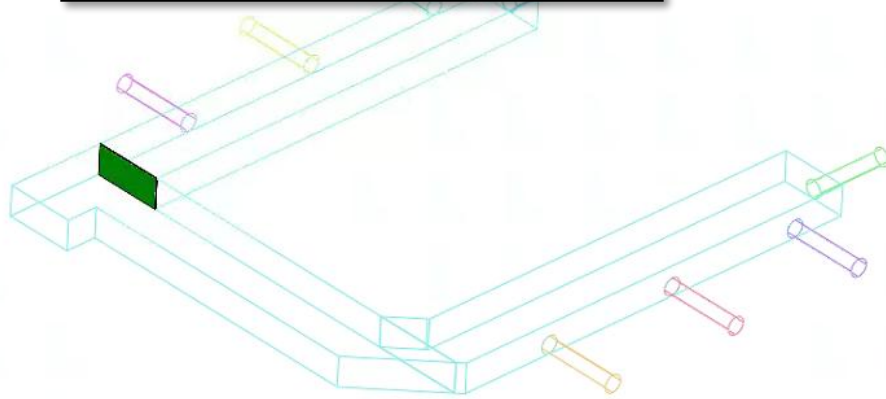
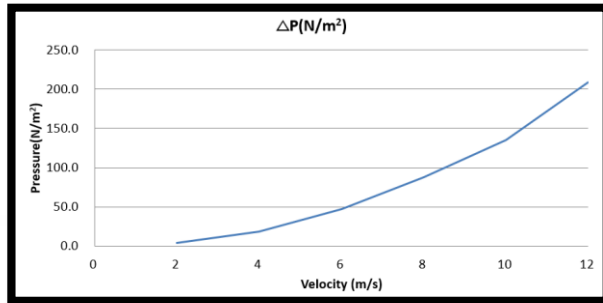


實體網格解析法模擬多孔板時，工程師經常會遇到網格生成、求解收斂、計算資源與邊界設定等層面的挑戰。

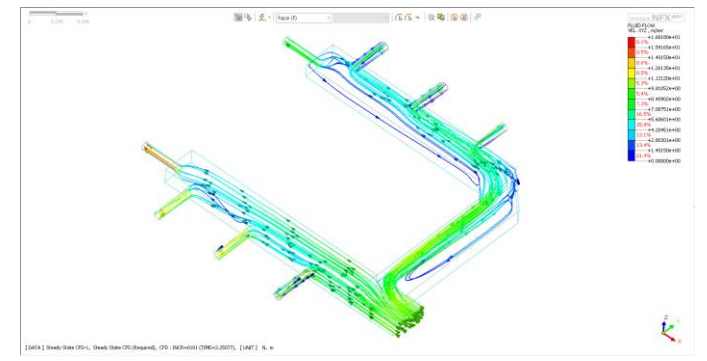
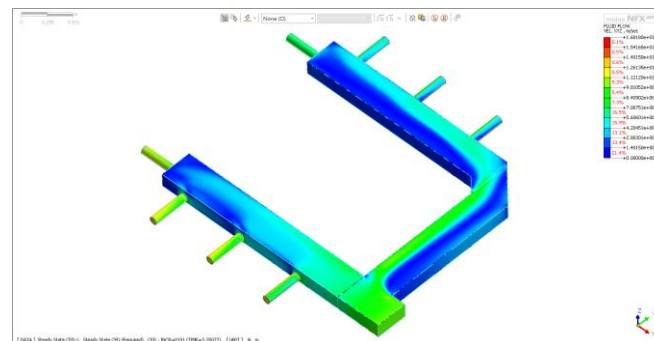
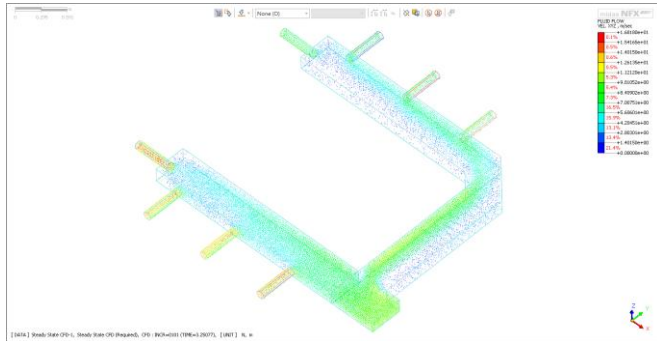
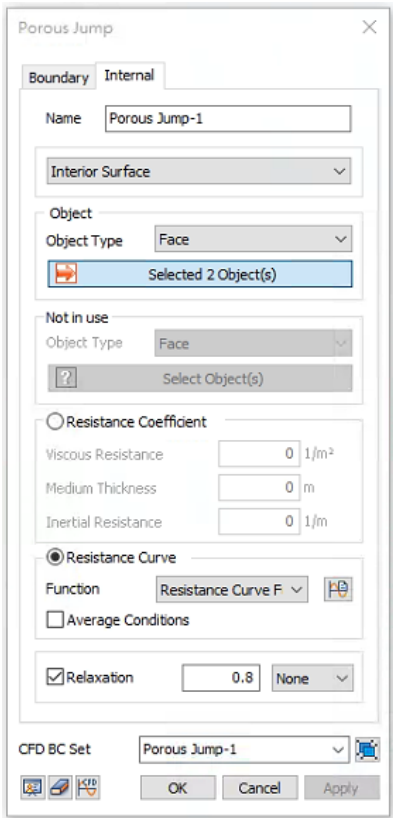


Part2_多孔介質模型法

多孔板效壓降-流速曲線



多孔介質模型法(Porous Media Model) 是 CFD 中模擬多孔板、濾網、催化劑床層等結構最主流且高效的方法。它不建立真實的幾何孔洞，而是將多孔板所在的區域簡化為一個「極薄的體積」或「無厚度的面」，等效多孔板造成的壓力損失與動量改變。

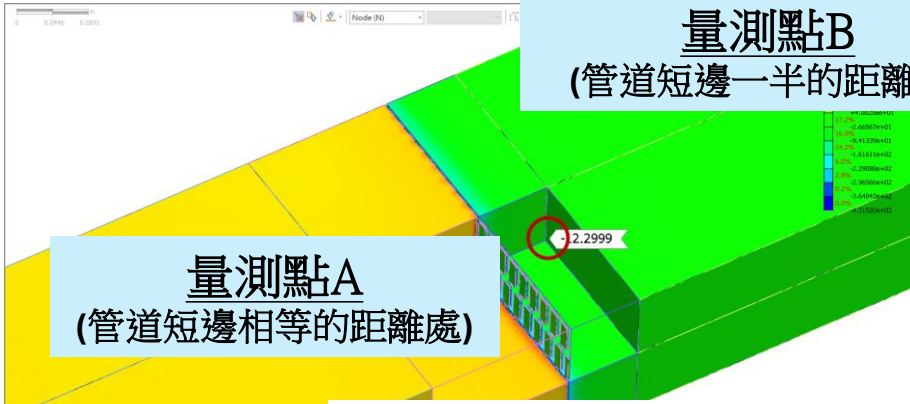
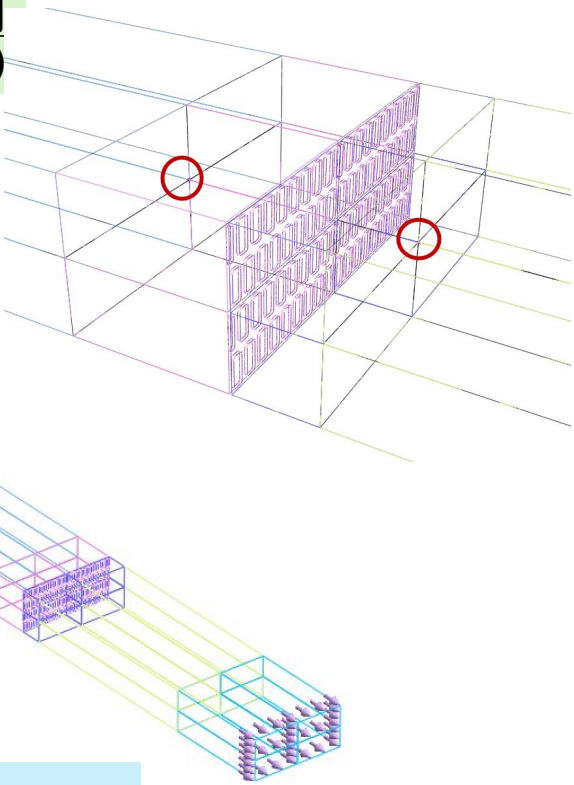


Part2.1_P-V Curve Analysis

多孔板壓降-流速曲線量測
(入流2、4、6、8、10、12(m/s))

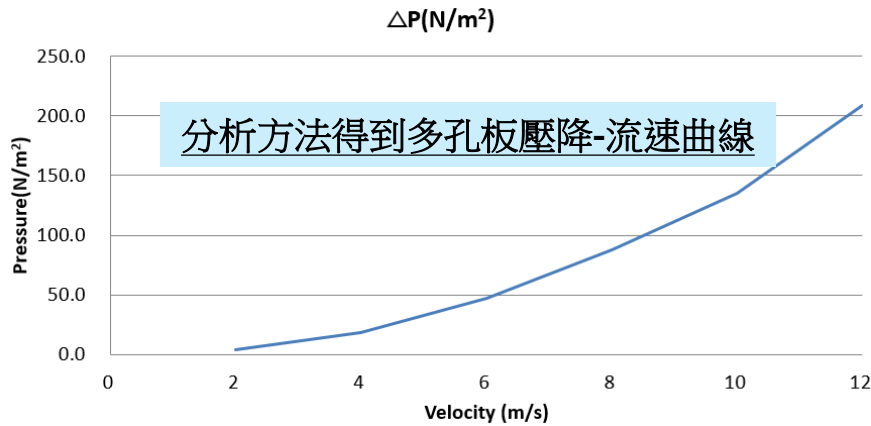
入流口

出流口 $P=0(N/m^2)$



量測點B
(管道短邊一半的距離處)

量測點A
(管道短邊相等的距離處)

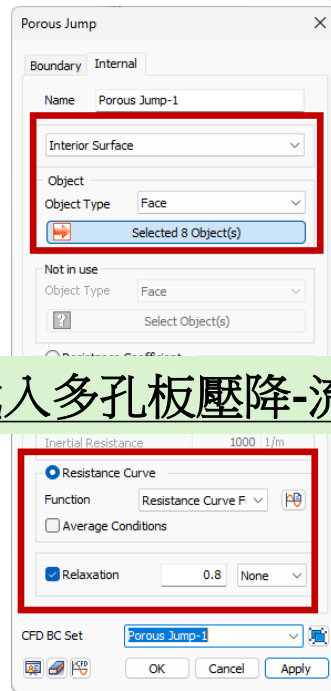
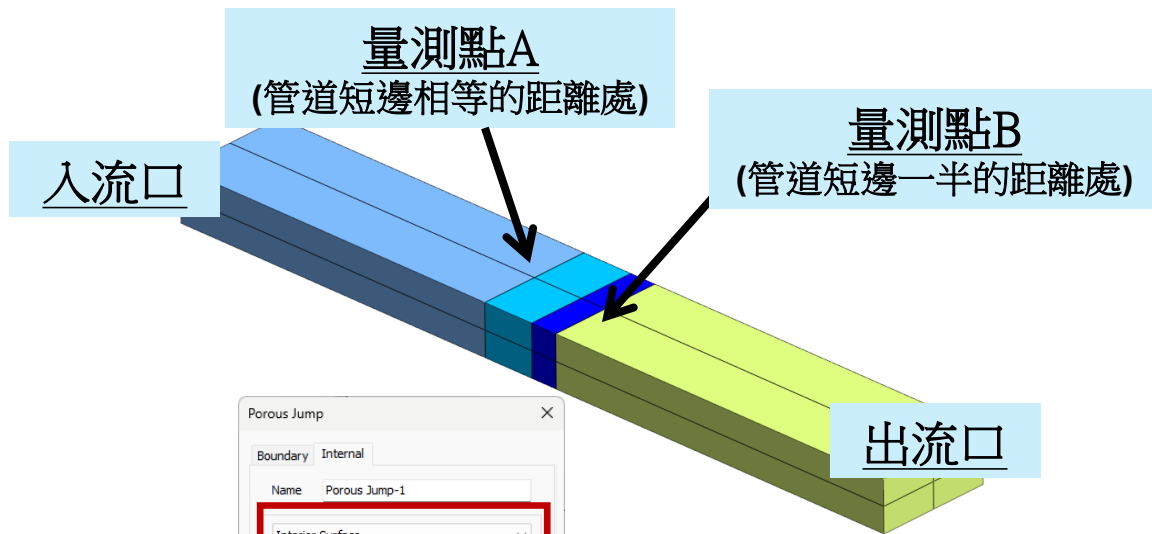


分析方法得到多孔板壓降-流速曲線

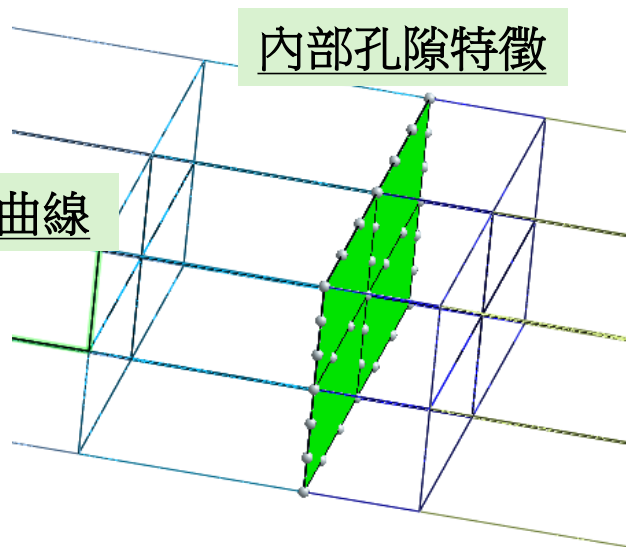
Velocity (m/s)	量測點A-Pressure	量測點B-Pressure	$\Delta P(N/m^2)$
2	4.3	0.1	4.2
4	15.9	-2.3	18.2
6	40.1645	-7.271	47.4
8	91.5903	3.5489	88.0
10	125.3217	-9.9492	135.3
12	196.7815	-12.2999	209.1



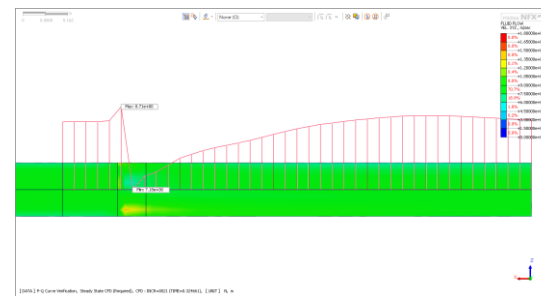
Part2.2_ P-V Curve Verification



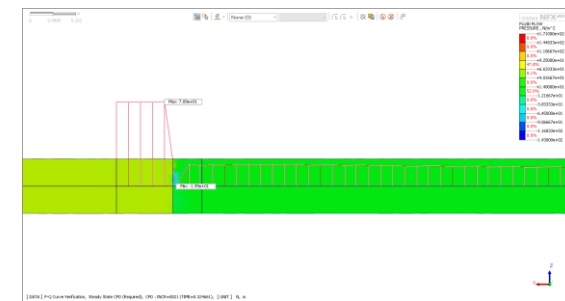
代入多孔板壓降-流速曲線



多孔板簡化模型分析數據

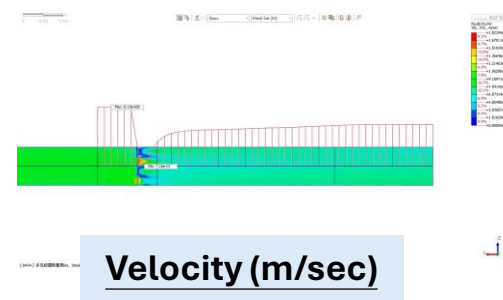


Velocity (m/sec)

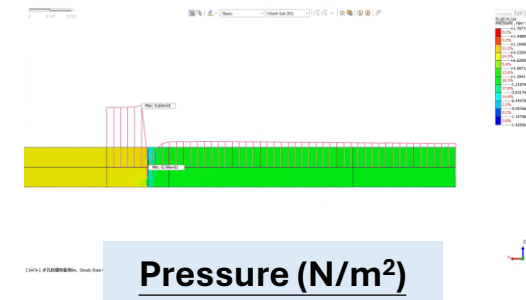


Pressure (N/m²)

多孔板詳細模型分析數據



Velocity (m/sec)



Pressure (N/m²)



鬆弛係數: 壓力值 = (當前壓力) × 鬆弛係數 + (1 - 鬆弛係數) × (上一步壓力)

MIDAS全方位工程模擬 - 以卓越技術/定義完美服務

Defining Service through Engineering Excellence.

