



Blind Analysis Contest 2009

Results of the Contest



Contest Categories

- Winner is selected for each of the four categories:
 - Category1 3D Analysis, Steel damper
 - Category2 3D Analysis, Viscous damper
 - Category3 2D Analysis, Steel damper
 - Category4 2D Analysis, Viscous damper

Basic Contest Rules

- Responses to be predicted (each item has four values which consist of the combination of small / big shaking and X / Y direction except for item c. For 2-D analysis, values of Y-direction and strain are to be predicted.)
 - a. Maximum values of absolute relative displacement from base and absolute acceleration at each floor
 - b. Maximum values of absolute story shear and story drift angle at each story
 - c. Maximum strain at a column in 1st story and middle of a beam in 2nd story
 - d. Maximum and minimum values of damper force in 1st and 4th story
 - e. Maximum and minimum values of damper deformation in 1st and 4th story

- Definition of errors: square-root of sum of squares of errors (RMS errors)

$$E_k = \sqrt{\sum_j (F_{k,j} - F_{k,j}^*)^2}$$

$F_{k,j}$: Predicted response

$F_{k,j}^*$: Measured (actual) response

- Points for each response:
8pt. for smallest RMS errors, 5pt. for 2nd, 3pt. for 3rd, 1pt. for 4th

Number of Participants

- 52 teams from 8 countries in total

Table : Number of Participants

Country \ Category	Category1	Category2	Category3	Category4	TOTAL
Japan	8	2	3	2	15
Taiwan	3	4	4	4	15
U.S.	2	4	3	3	12
China	2	4	0	0	6
N.Z.	1	0	0	0	1
Italy	1	0	0	0	1
Canada	0	0	1	0	1
UAE	0	0	0	1	1
TOTAL	17	14	11	10	52

Category 1: 3D Analysis, Steel Damper Category 3: 2D Analysis, Steel Damper

Category 2: 3D Analysis, Viscous Damper Category 4: 2D Analysis, Viscous Damper

Participants (1)

- **Category1 : 3D Steel Damper (Honorific title abbreviation)**

Akihiro Nakao (+7)	Nihon Sekkei, Inc., Japan
Hidenori Shimizu (+3)	Ando Corporation, Japan
Minoru Shugyo	Nagasaki University, Japan
Naohiro Nakamura(+5)	Takenaka Corporation, Japan
Tadamichi Yamashita (+5)	Kozo Keikaku Engineering Inc., Japan
Takafumi Nakagawa (+3)	Building Research Institute, Japan
Takehiko Terada (+2)	Shimizu Corporation, Japan
Tomohiko Moroishi (+3)	Maeda Corporation, Japan
Gary S Prinz (+1)	Brigham Young University, U.S.
Liling Cao (+3)	Thornton Tomasetti Inc., U.S.
Shuguang Wang (+3)	Nanjing University of Technology, China
Xuchuan Lin (+3)	Tsinghua University, China
Ming-Chieh Chuang (+4)	National Center for Research on Earthquake Eng., Taiwan
Yi-Jer Yu (+3)	National Center for Research on Earthquake Eng., Taiwan
Yuan-Tao Weng (+4)	National Center for Research on Earthquake Eng., Taiwan
Rui Pinho (+3)	EUCENTRE Pavia, Italy
Trevor Kelly (+1)	Holmes Consulting Group, New Zealand

Participants (2)

- **Category2 : 3D Viscous Damper (Honorific title abbreviation)**

Naohiro Nakamura (+5)	Takenaka Corporation, Japan
Tadamichi Yamashita (+5)	Kozo Keikaku Engineering Inc., Japan
Bill Tremayne	Holmes Culley, U.S.
Ganesh Thiagarajan (+1)	University of Missouri Kansas City, U.S.
Liling Cao (+3)	Thornton Tomasetti Inc., U.S.
Oh-Sung Kwon (+1)	Missouri University of Science and Technology, U.S.
Dino Chen	South China Univ. of Tech, China
Dongsheng Du (+3)	Nanjing University of Technology, China
Jianrong Yang (+6)	Kunming University of Science and Technology, China
Panwen (+6)	Kunming University of Science and Technology, China
Ming-Chieh Chuang (+4)	National Center for Research on Earthquake Eng., Taiwan
Tzu Kang Lin (+4)	National Center for Research on Earthquake Eng., Taiwan
Yi-Jer Yu (+3)	National Center for Research on Earthquake Eng., Taiwan
Yuan-Tao Weng (+4)	National Center for Research on Earthquake Eng., Taiwan

Participants (3)

- **Category3 : 2D Steel Damper (Honorific title abbreviation)**

Harumi Yoneda (+5)	Takenaka Corporation, Japan
Tadamichi Yamashita (+4)	Kozo Keikaku Engineering Inc., Japan
Yasuyuki Nagano (+ 8)	Fukui University of Technology, Japan
Bruce Maison	Structural Engineer, U.S.
Liling Cao (+3)	Thornton Tomasetti Inc., U.S.
Yushu Liu (+3)	Stanford University, U.S.
Ming-Chieh Chuang (+4)	National Center for Research on Earthquake Eng., Taiwan
Tzu Kang Lin (+4)	National Center for Research on Earthquake Eng., Taiwan
Yi-Jer Yu (+3)	National Center for Research on Earthquake Eng., Taiwan
Yuan-Tao Weng (+4)	National Center for Research on Earthquake Eng., Taiwan
Jack Wen Wei Guo	University of Toronto, Canada

Participants (4)

- **Category4 : 2D Viscous Damper (Honorific title abbreviation)**

Harumi Yoneda (+5)

Takenaka Corporation, Japan

Tadamichi Yamashita (+4)

Kozo Keikaku Engineering Inc., Japan

Bruce Maison

Structural Engineer, U.S.

Dimitrios Lignos (+3)

Stanford University, U.S.

Liling Cao (+3)

Thornton Tomasetti Inc., U.S.

Ming-Chieh Chuang (+4)

National Center for Research on Earthquake Eng., Taiwan

Yi-Jer Yu (+3)

National Center for Research on Earthquake Eng., Taiwan

Yuan-Tao Weng (+4)

National Center for Research on Earthquake Eng., Taiwan

Tzu Kang Lin (+4)

National Center for Research on Earthquake Eng., Taiwan

Mohamed Al Satari

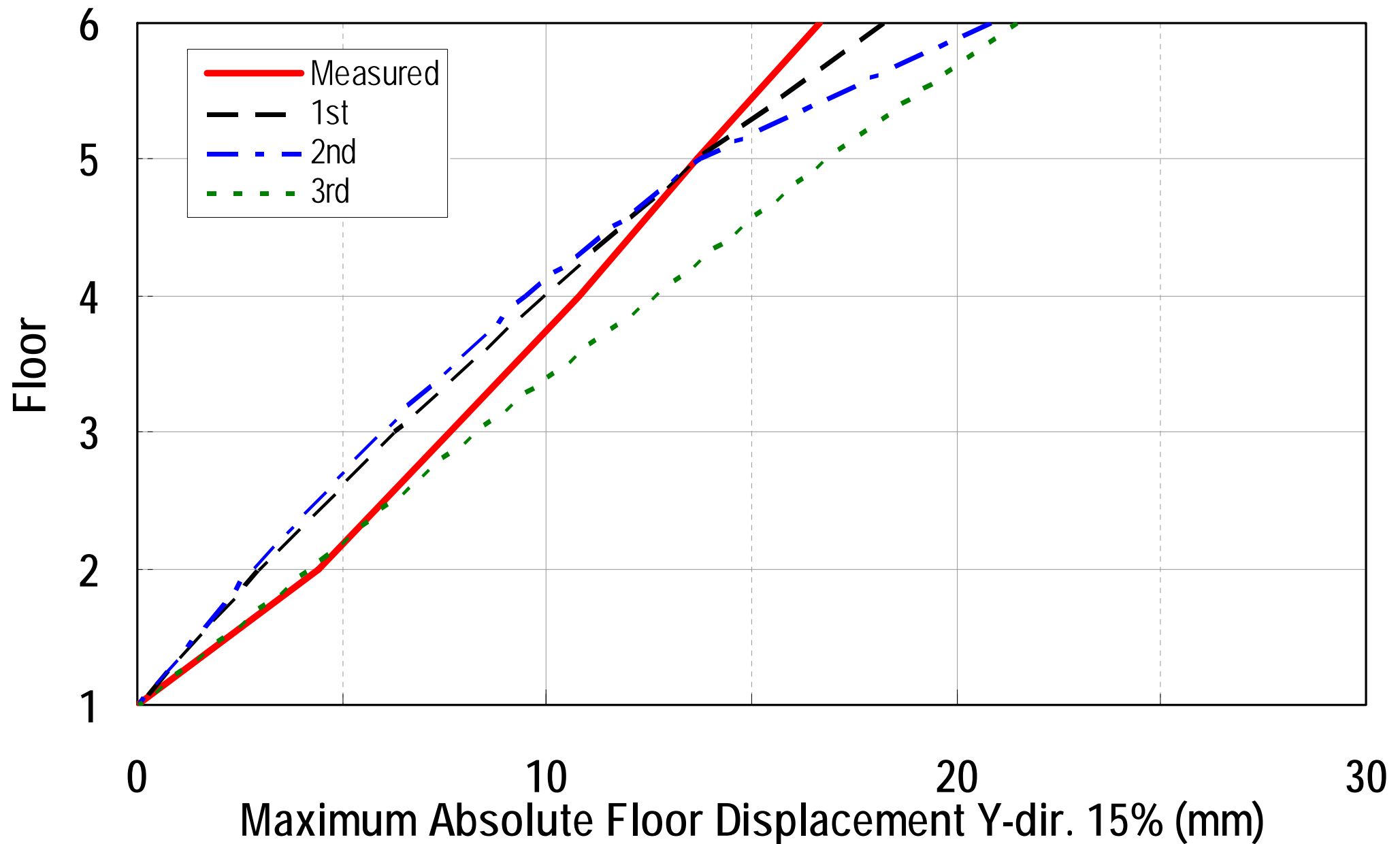
American University of Sharjah, UAE



Category 1 : 3D Analysis Steel Damper

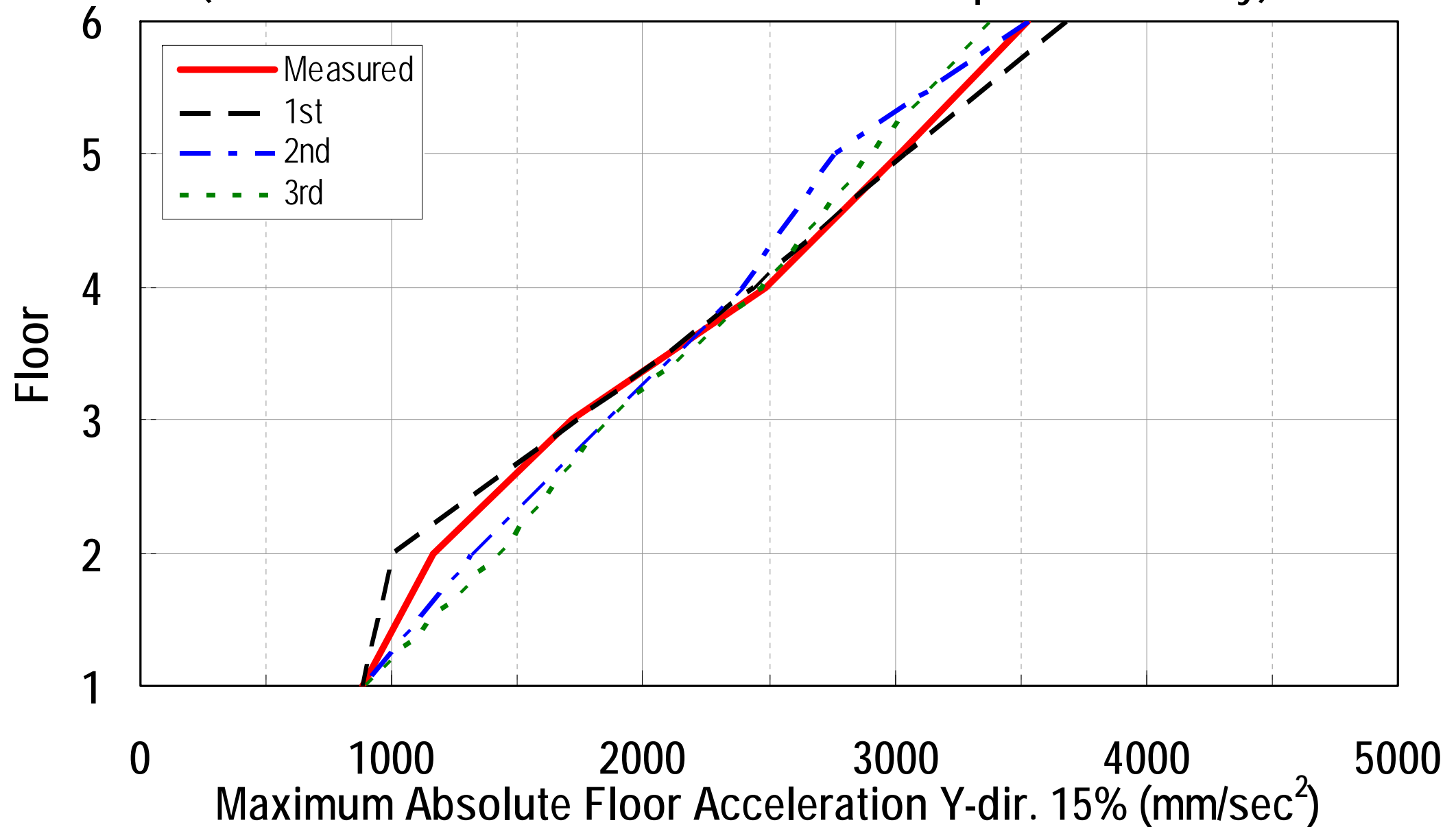
(Measured and Best 3 Teams of Each Response Quantity)

3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



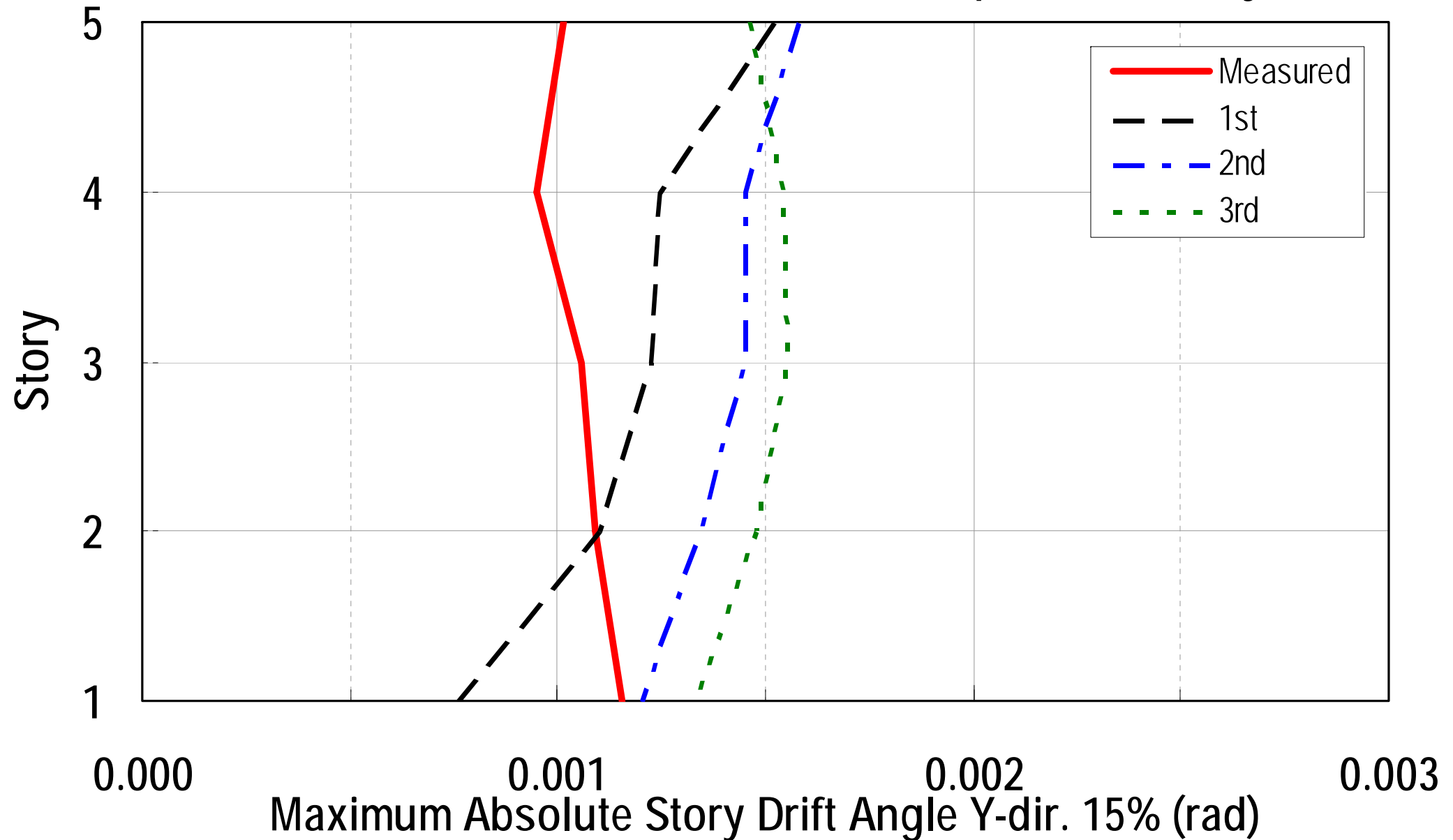


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



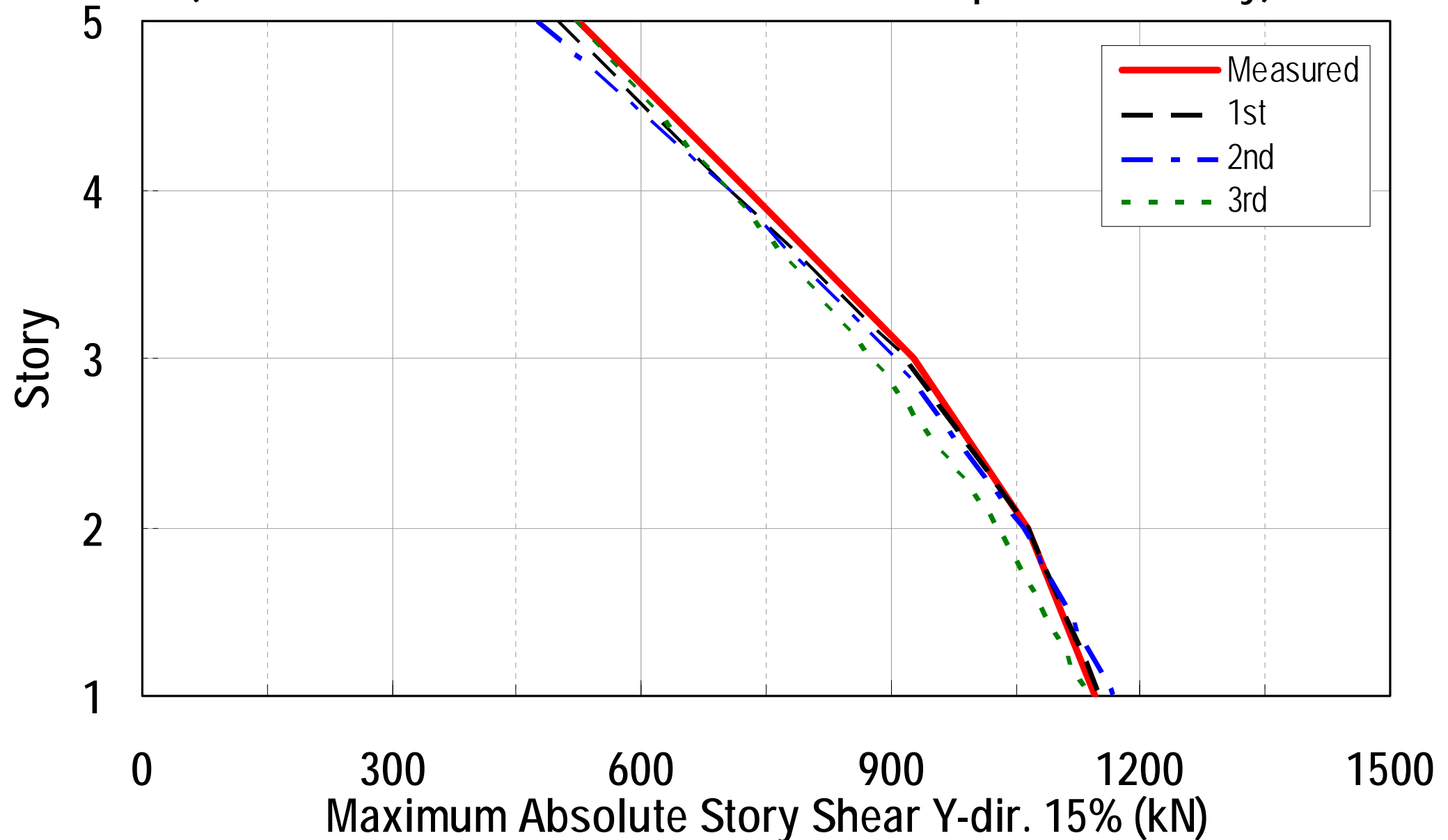


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



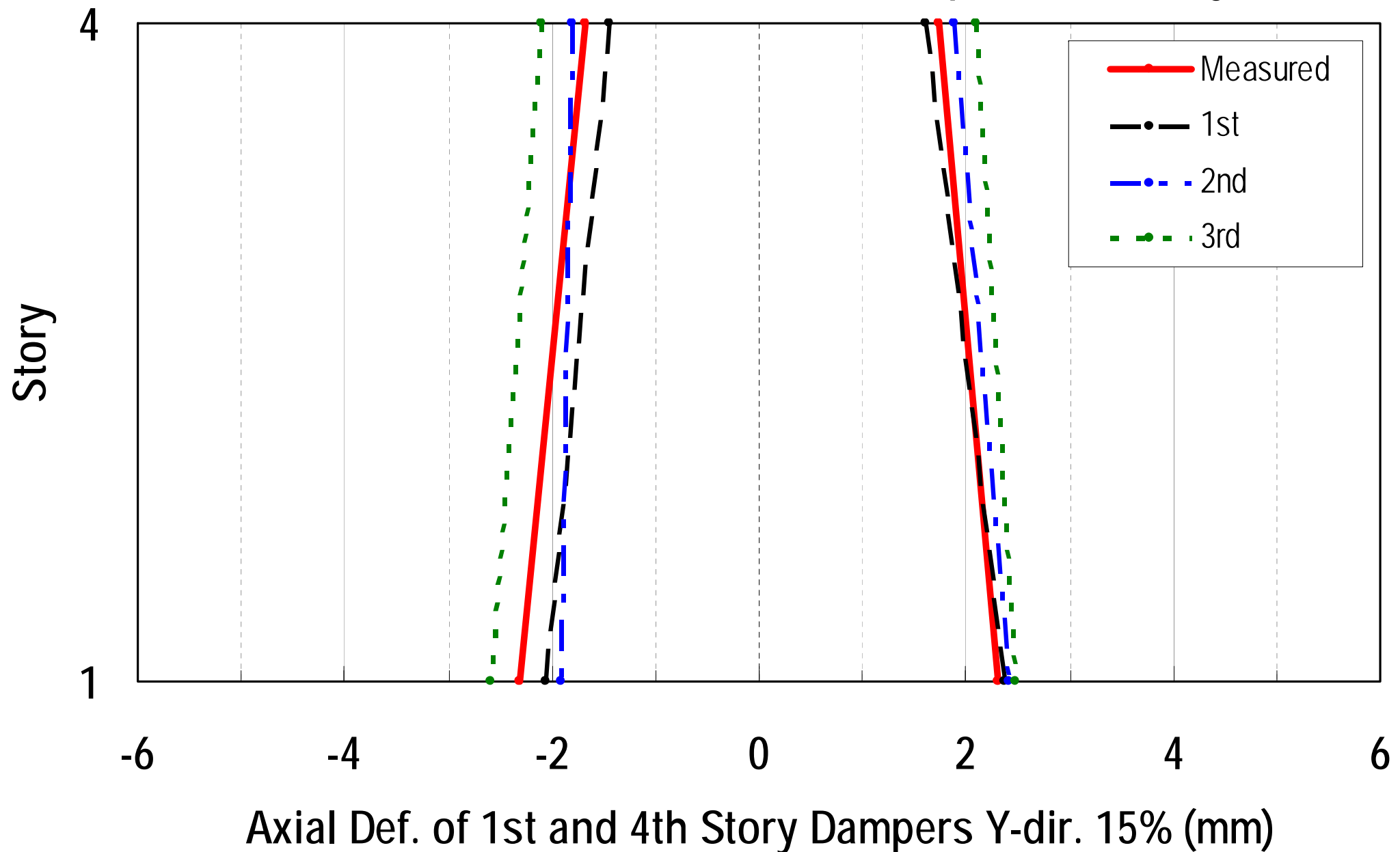


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)

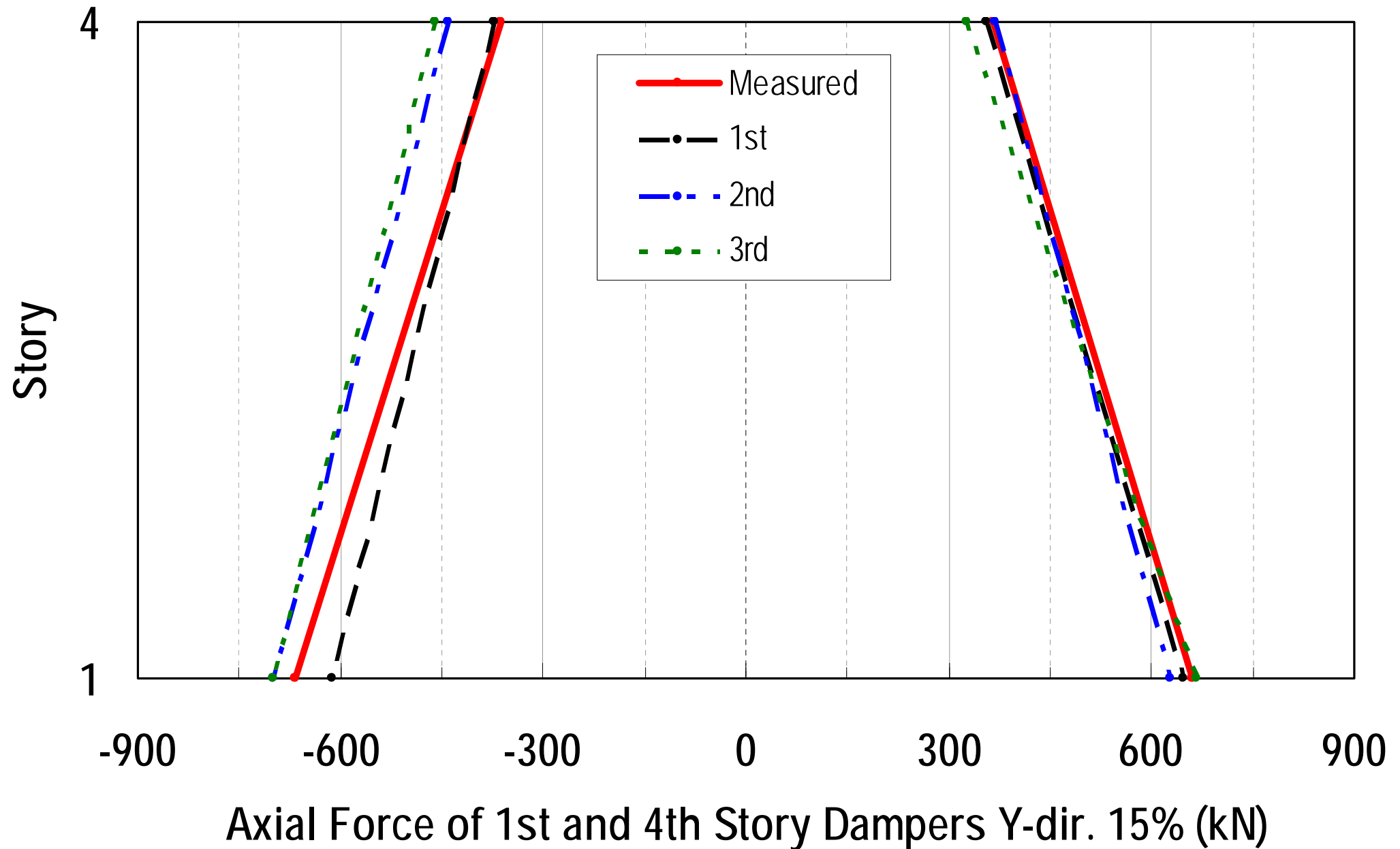




3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)

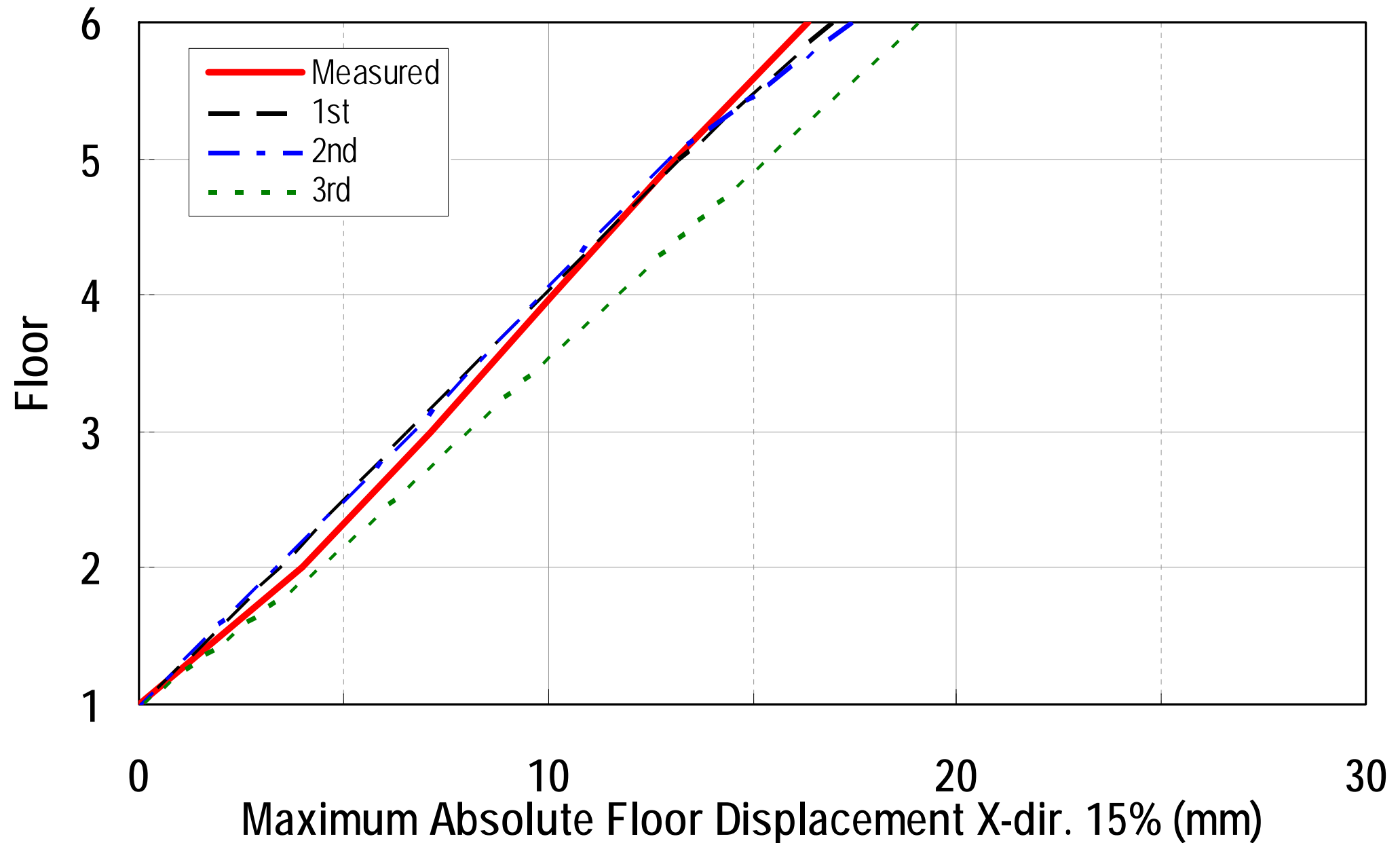


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



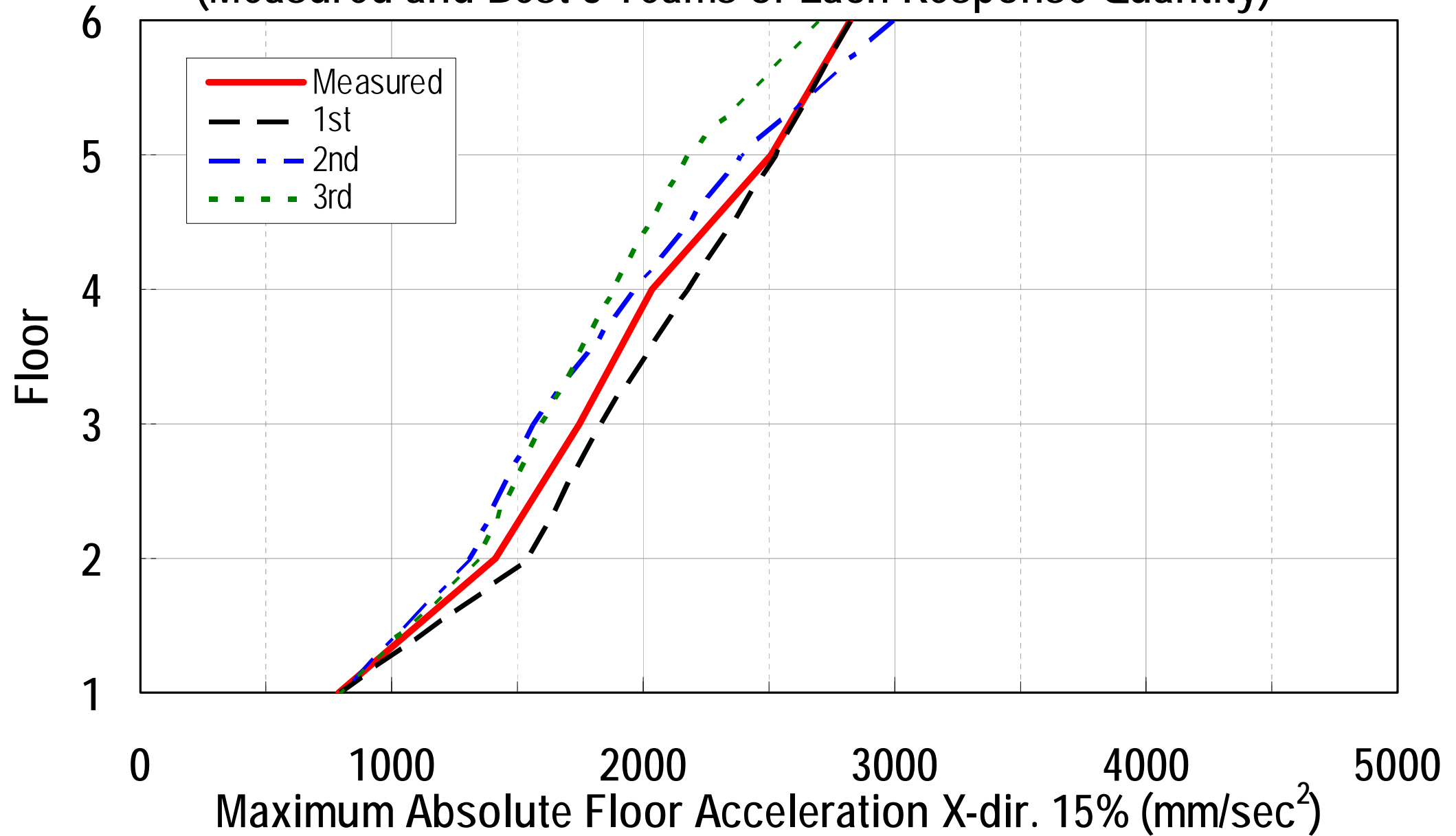


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



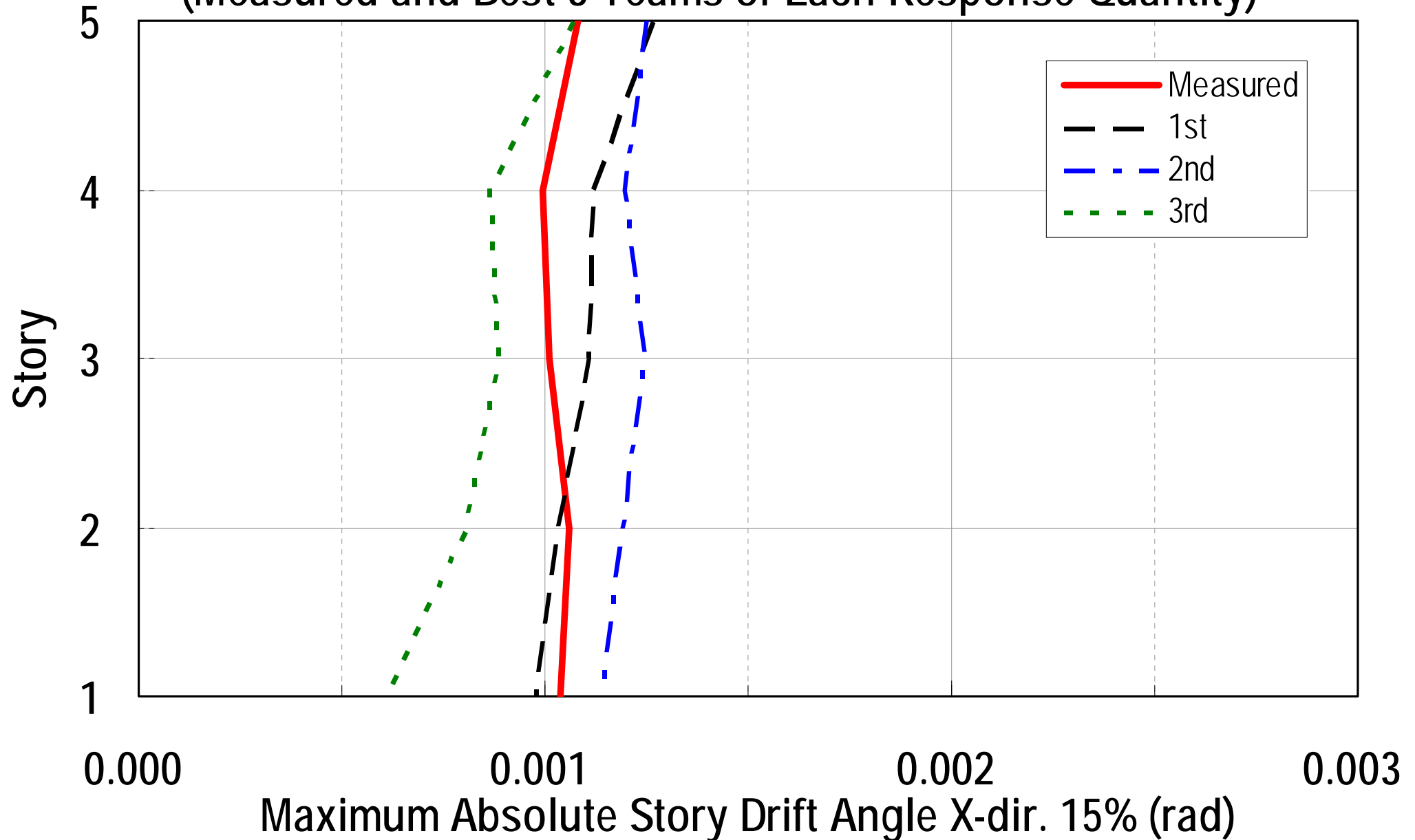


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



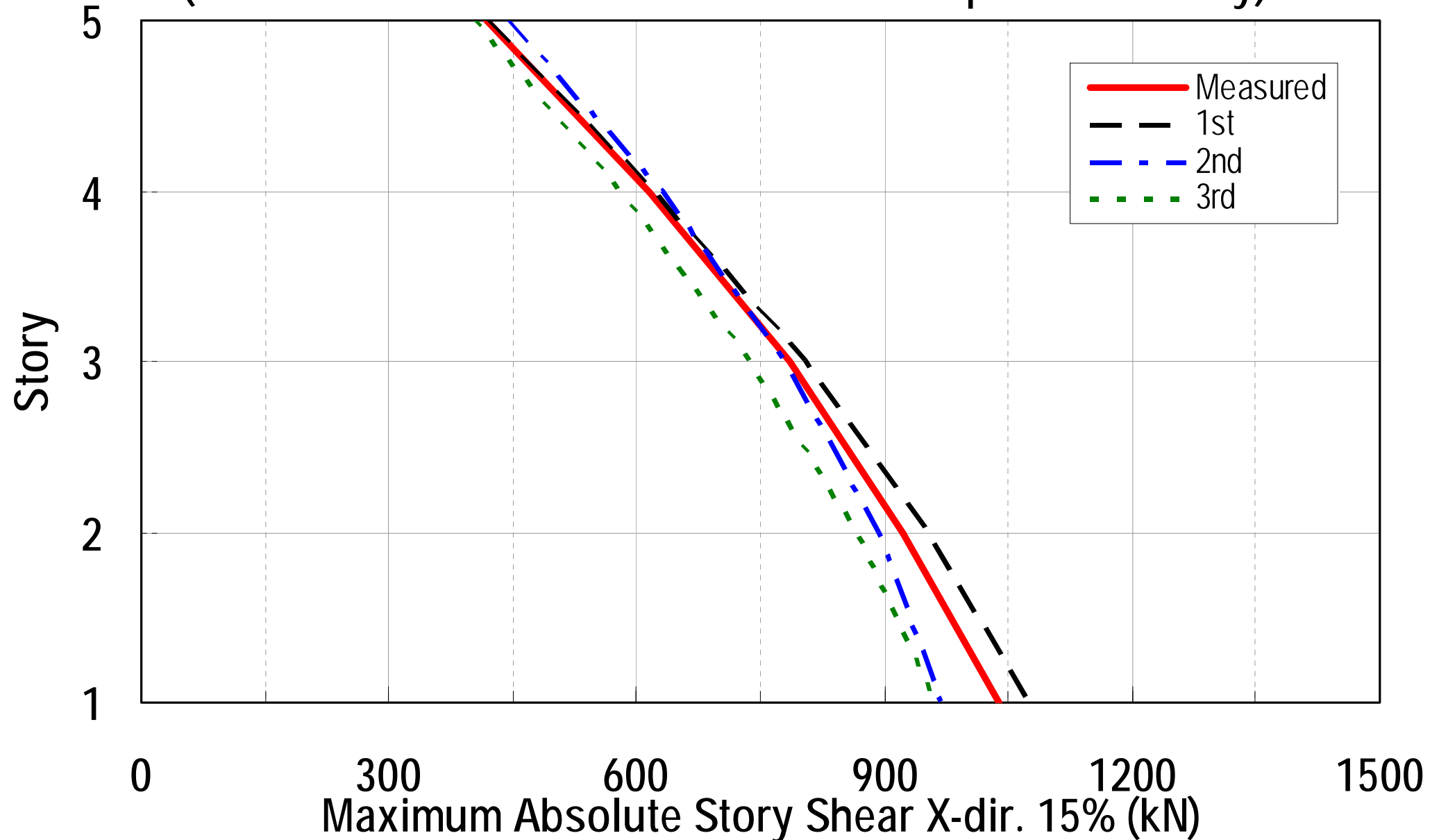


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



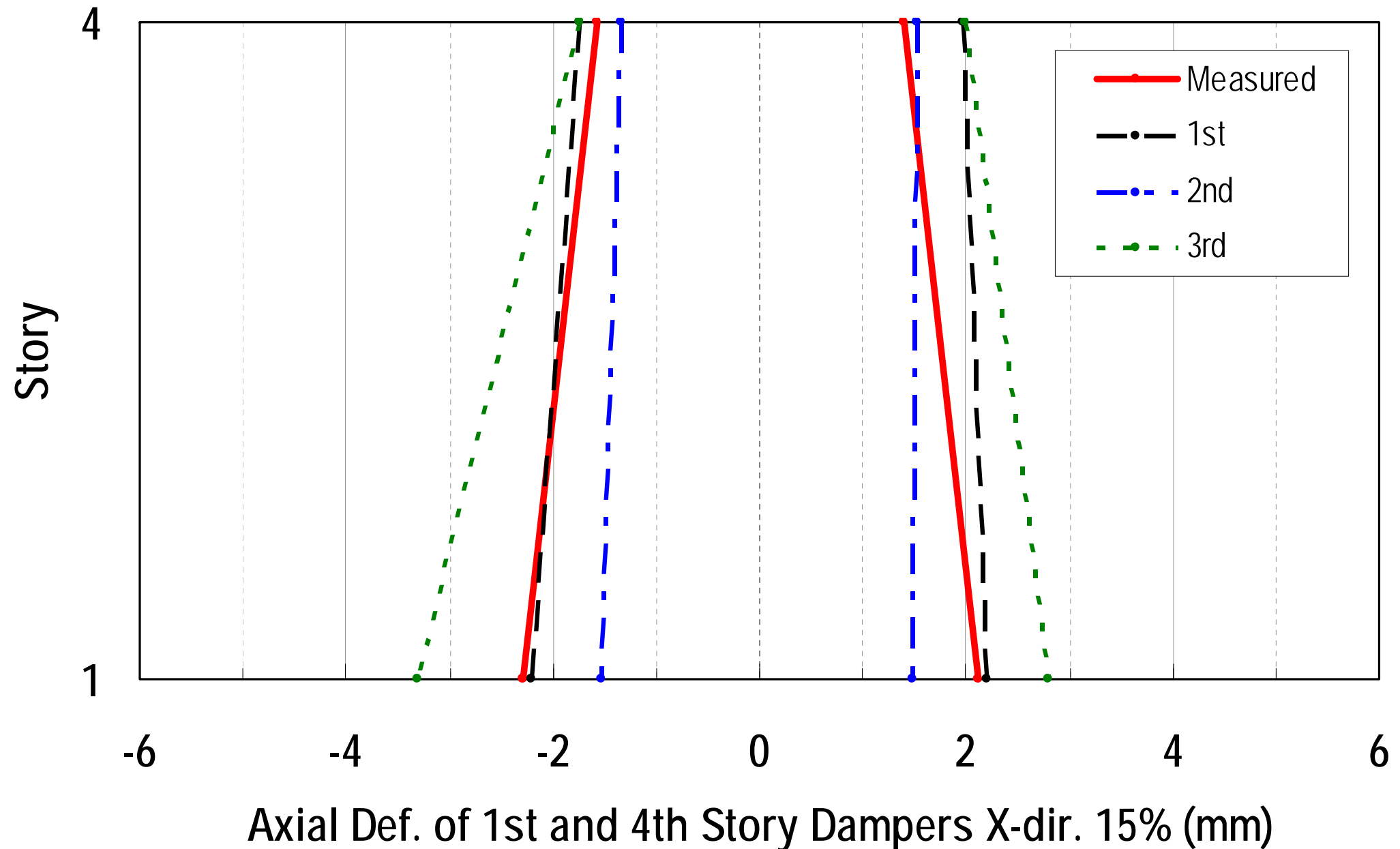


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)

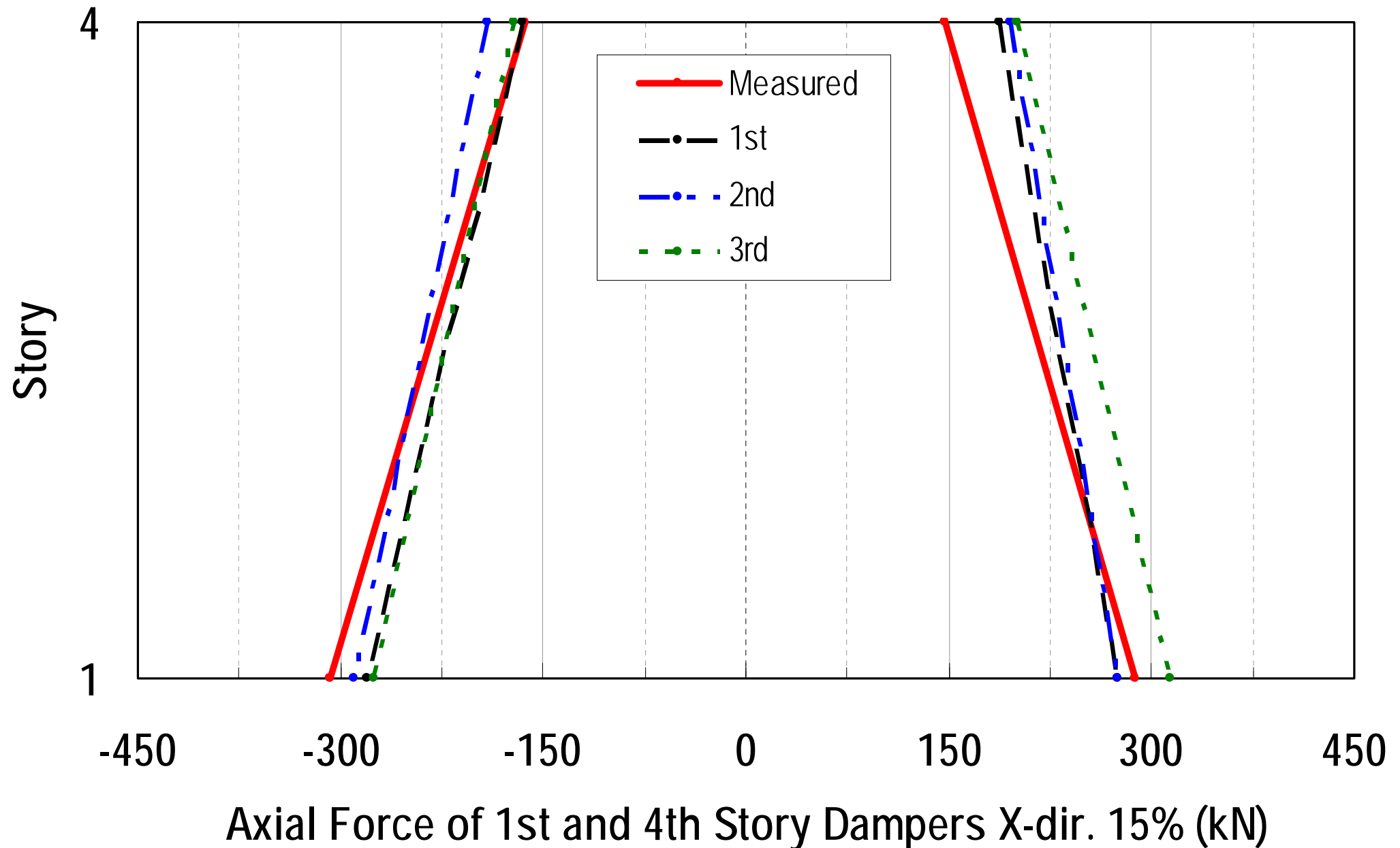




3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)

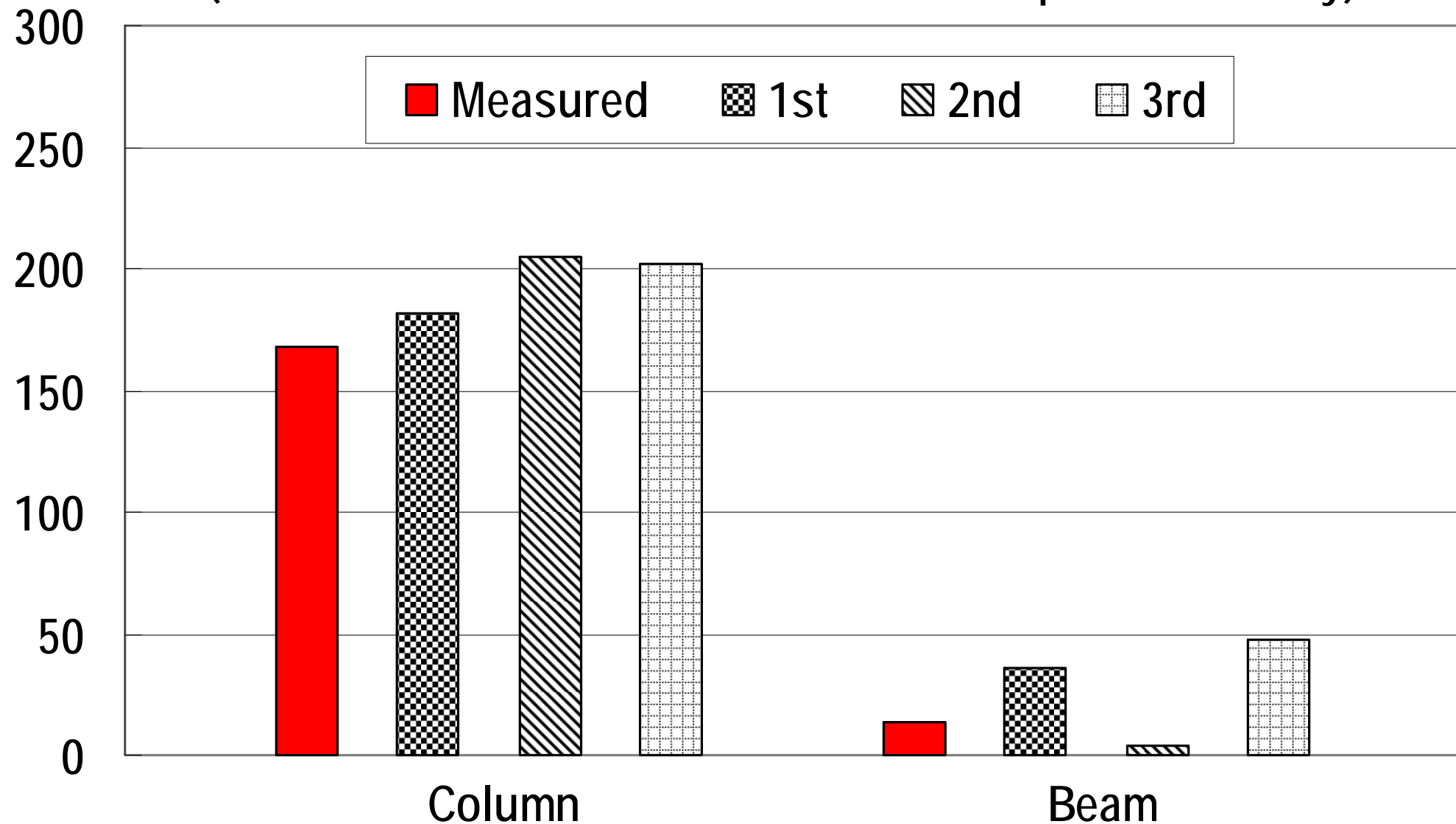


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



3D Steel Damper Blind Analysis Prediction Results

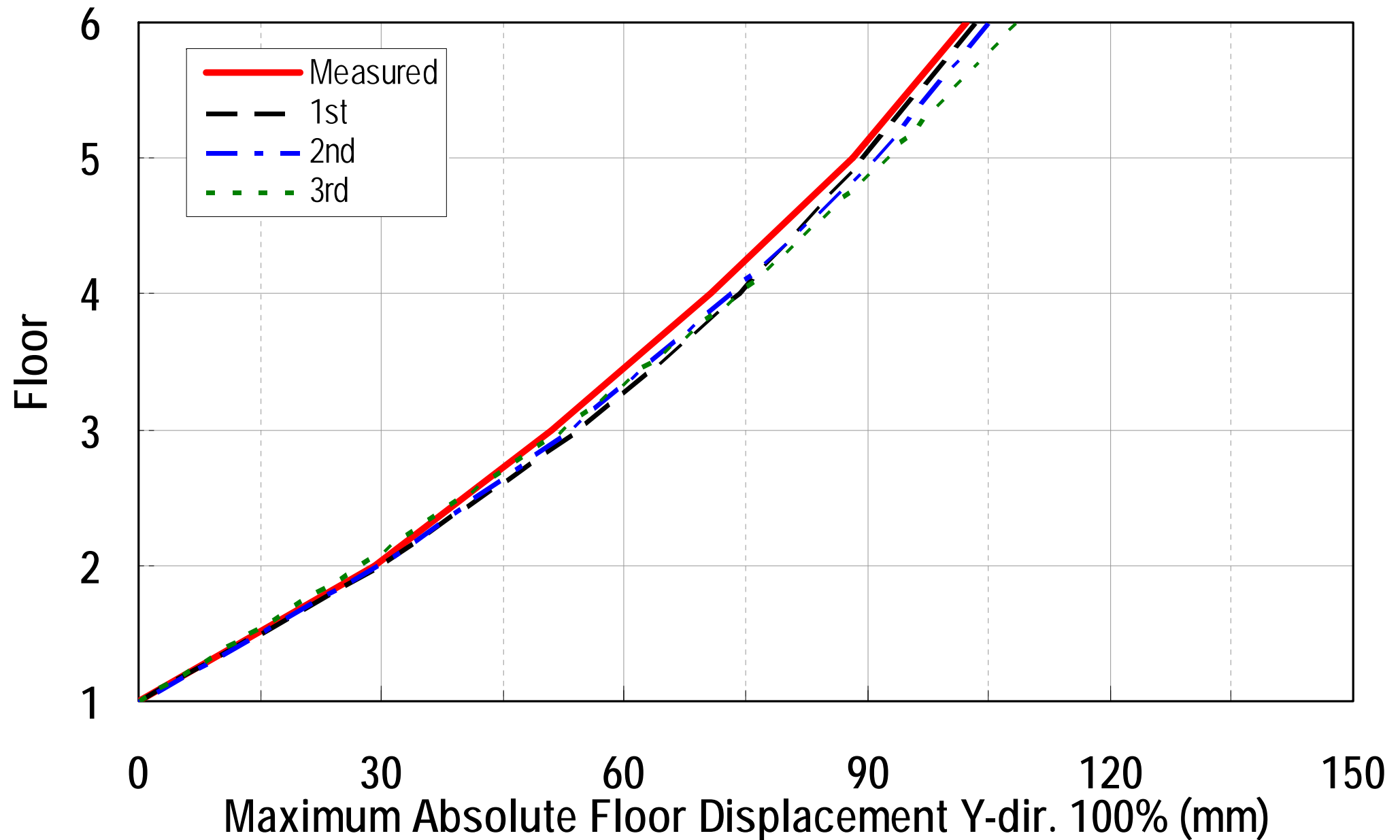
(μ) (Measured and Best 3 Teams of Each Response Quantity)



Axial Strain at the Designated Points of Colum and Beam 15%

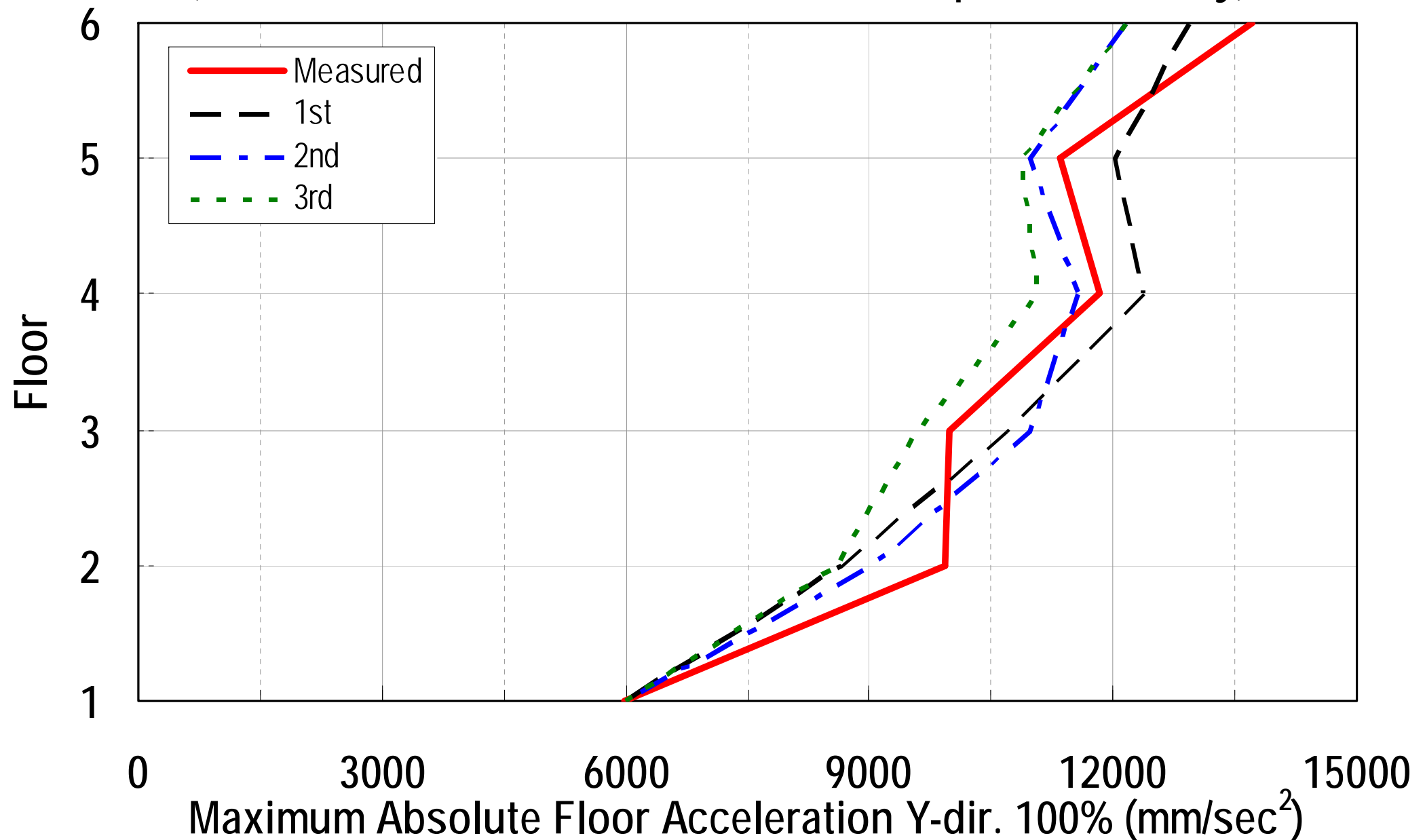


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



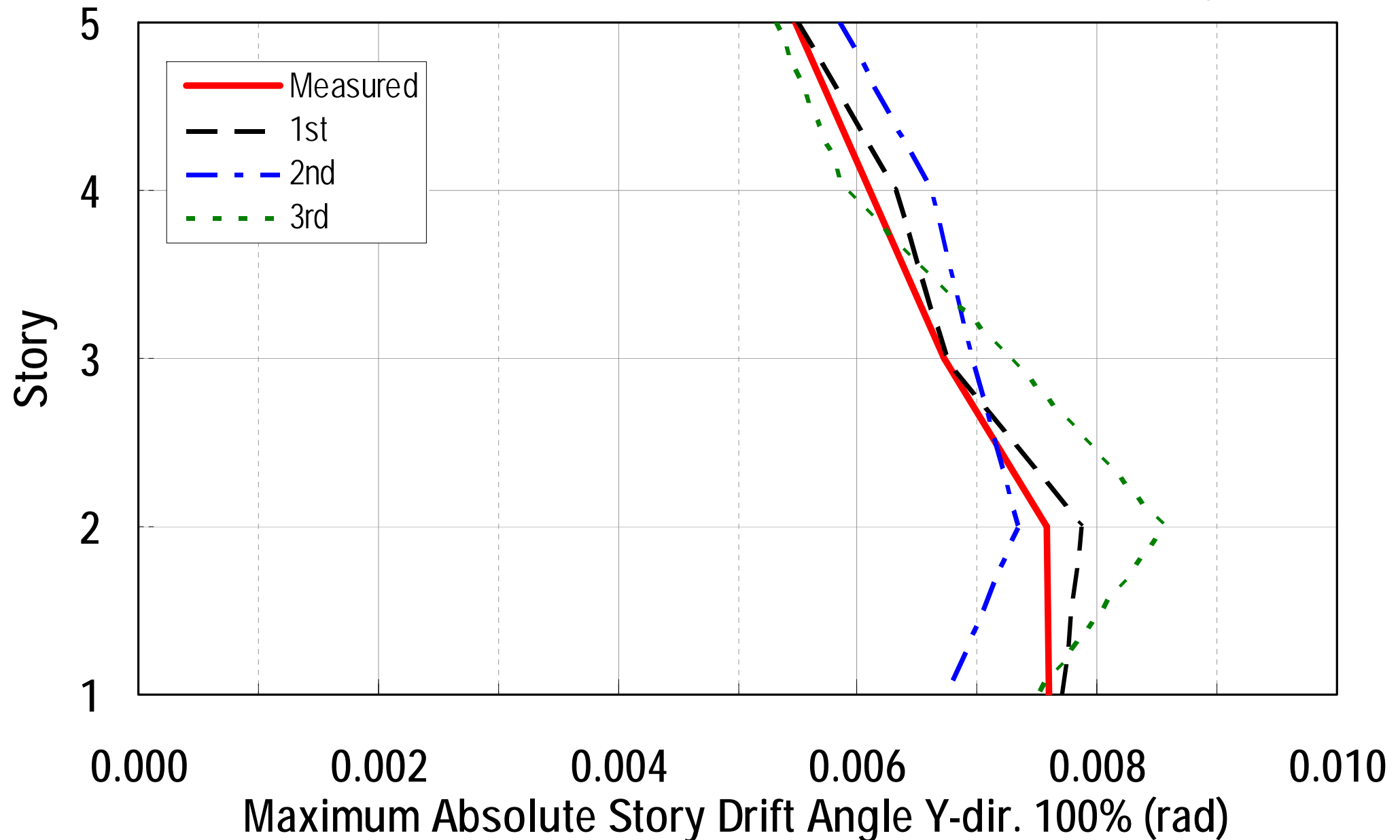


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



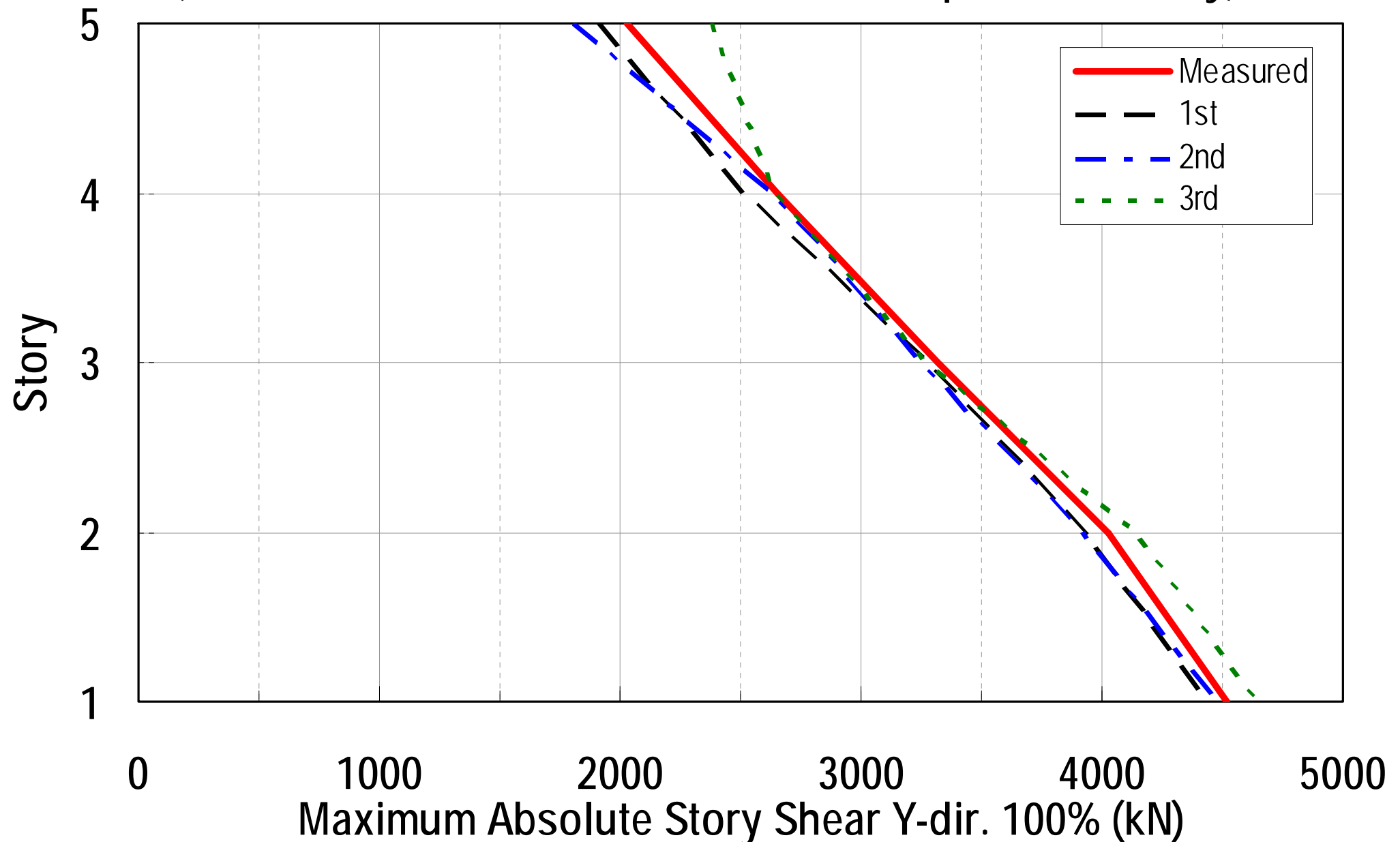


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



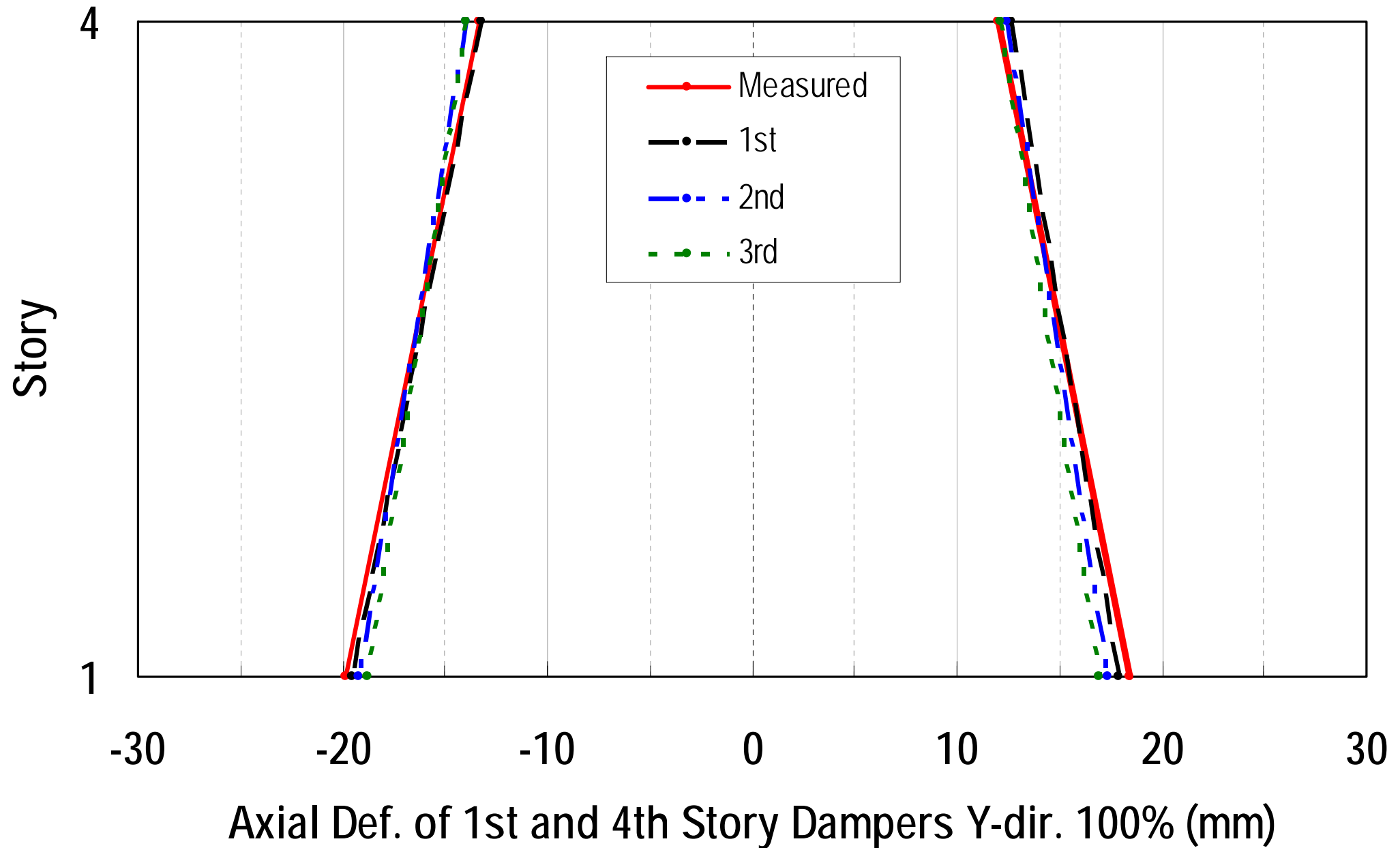


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



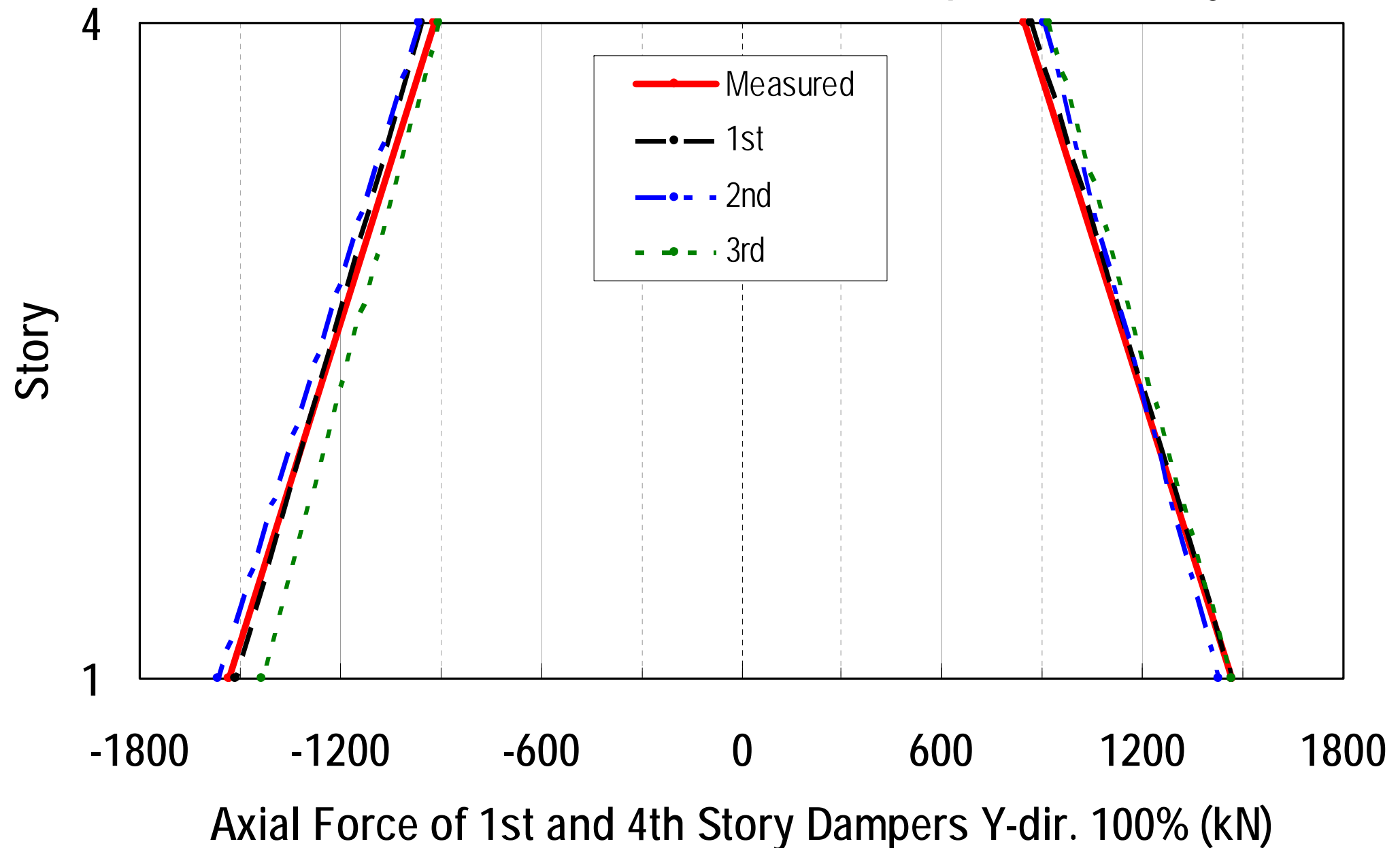


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



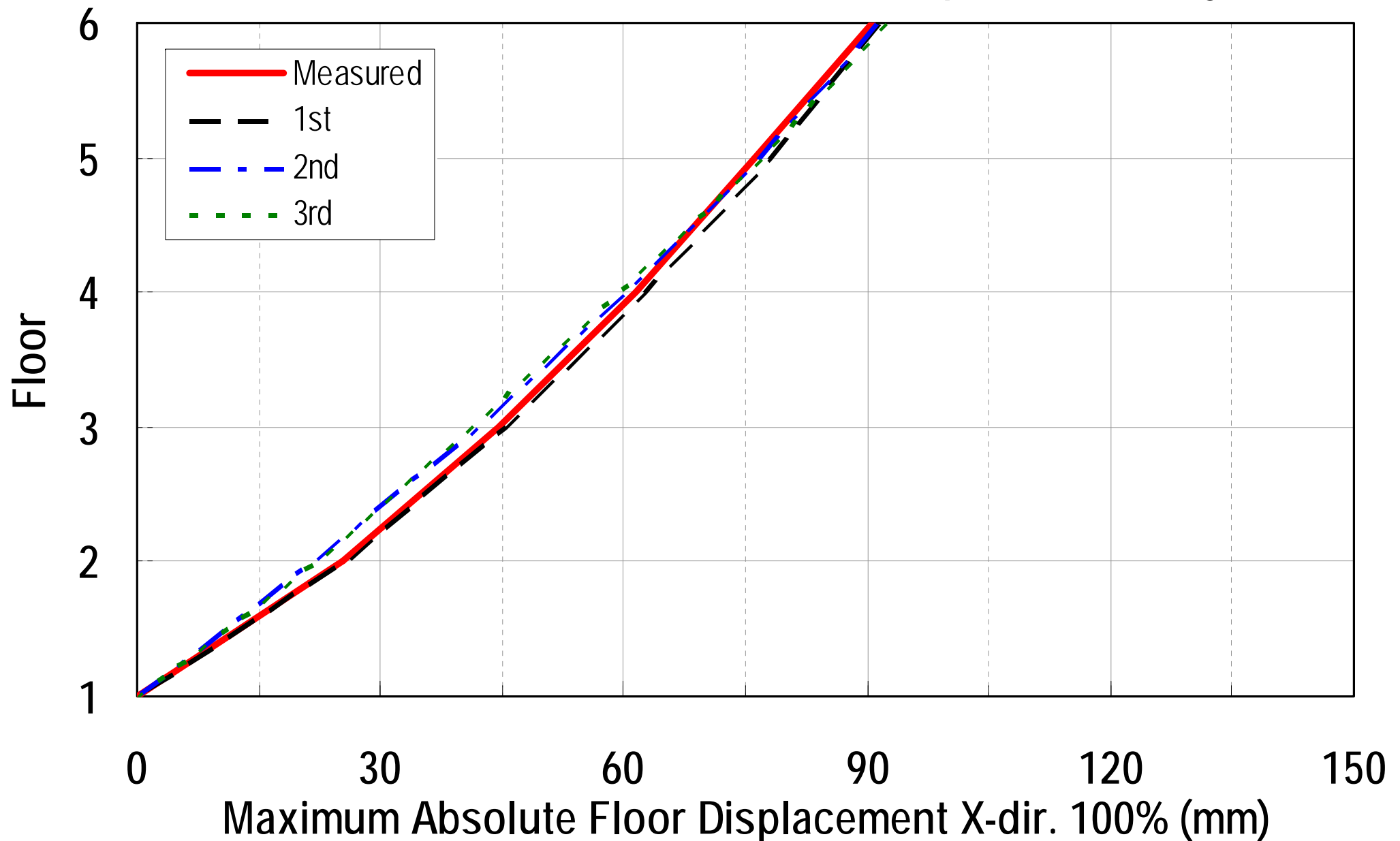


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



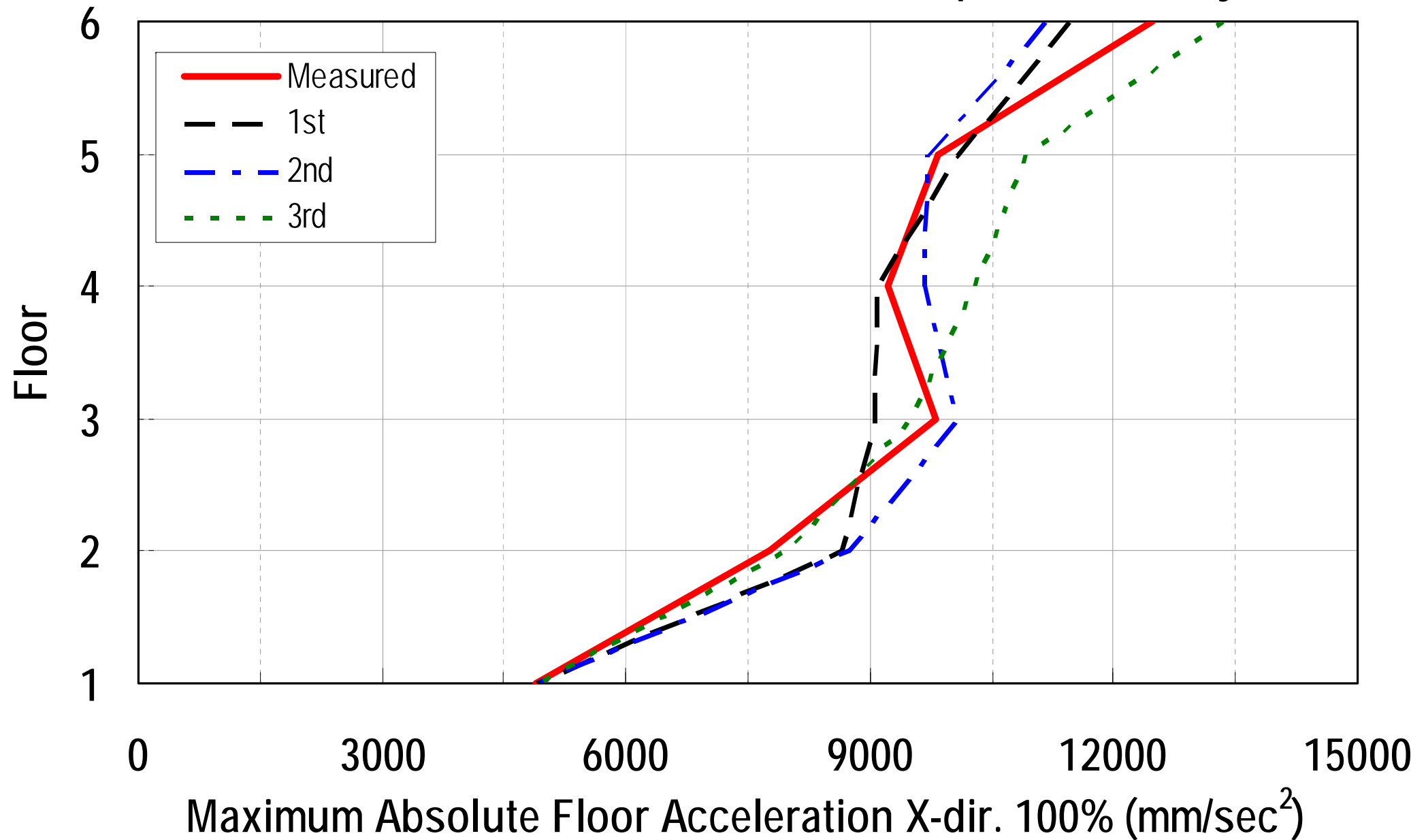


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



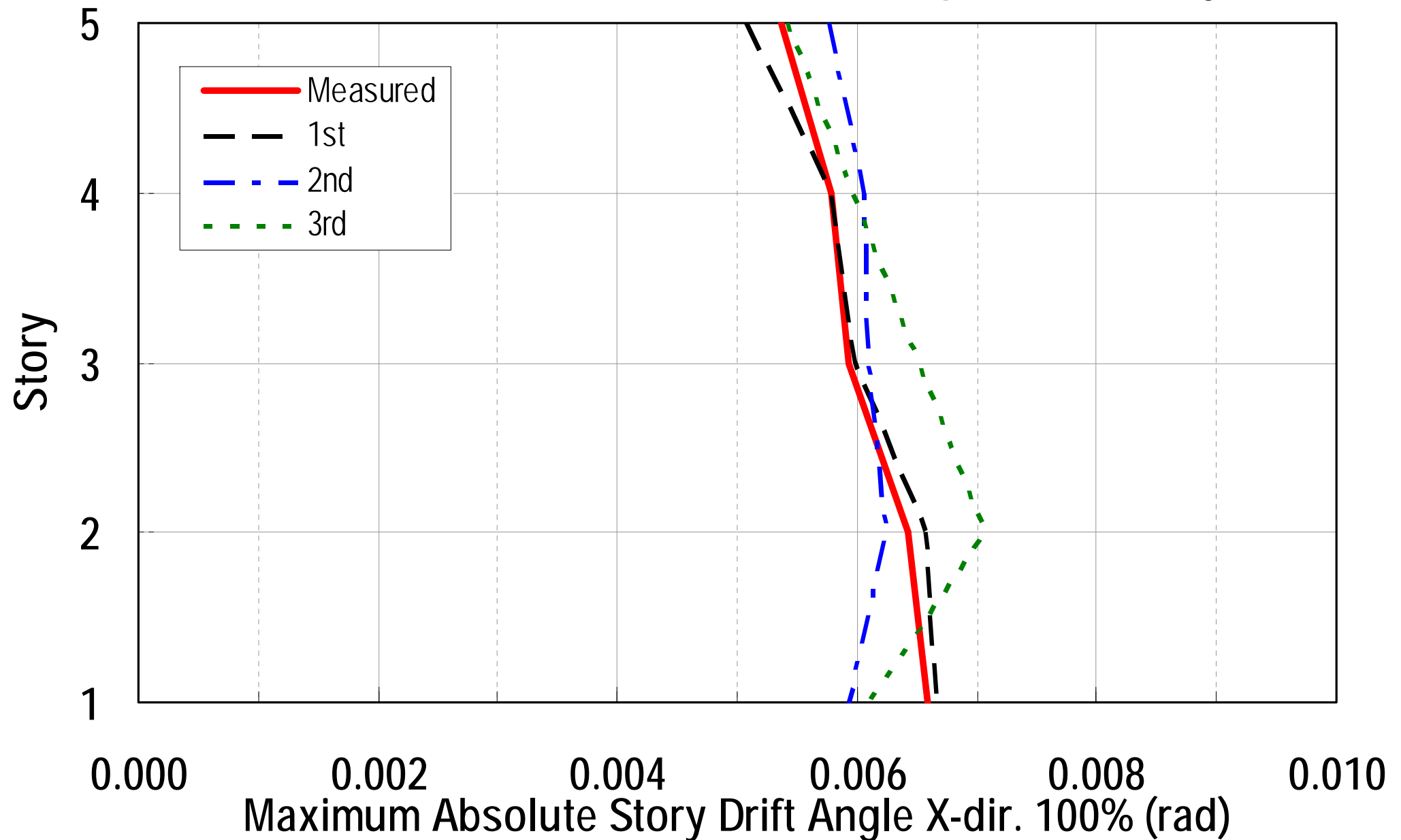


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



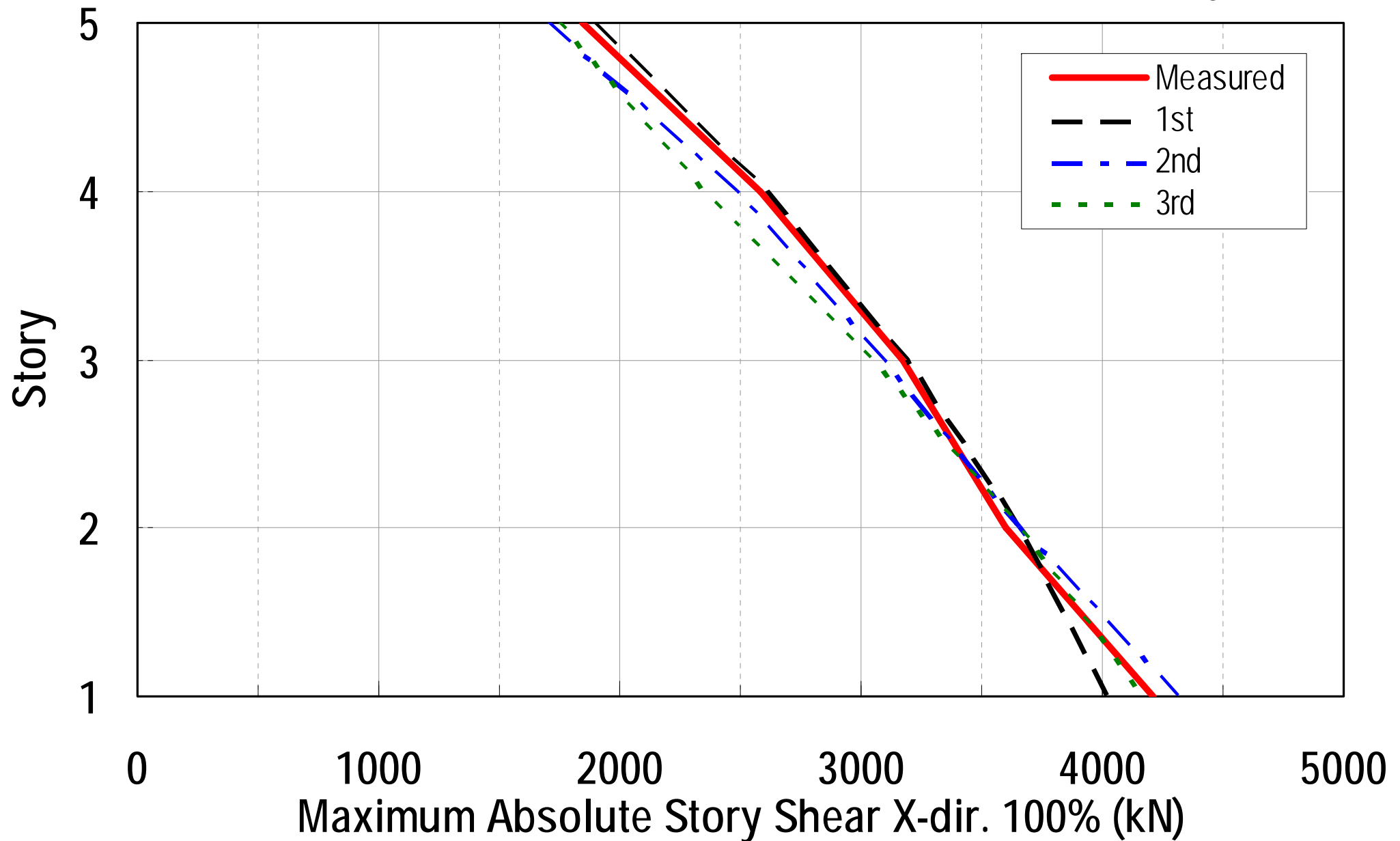


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



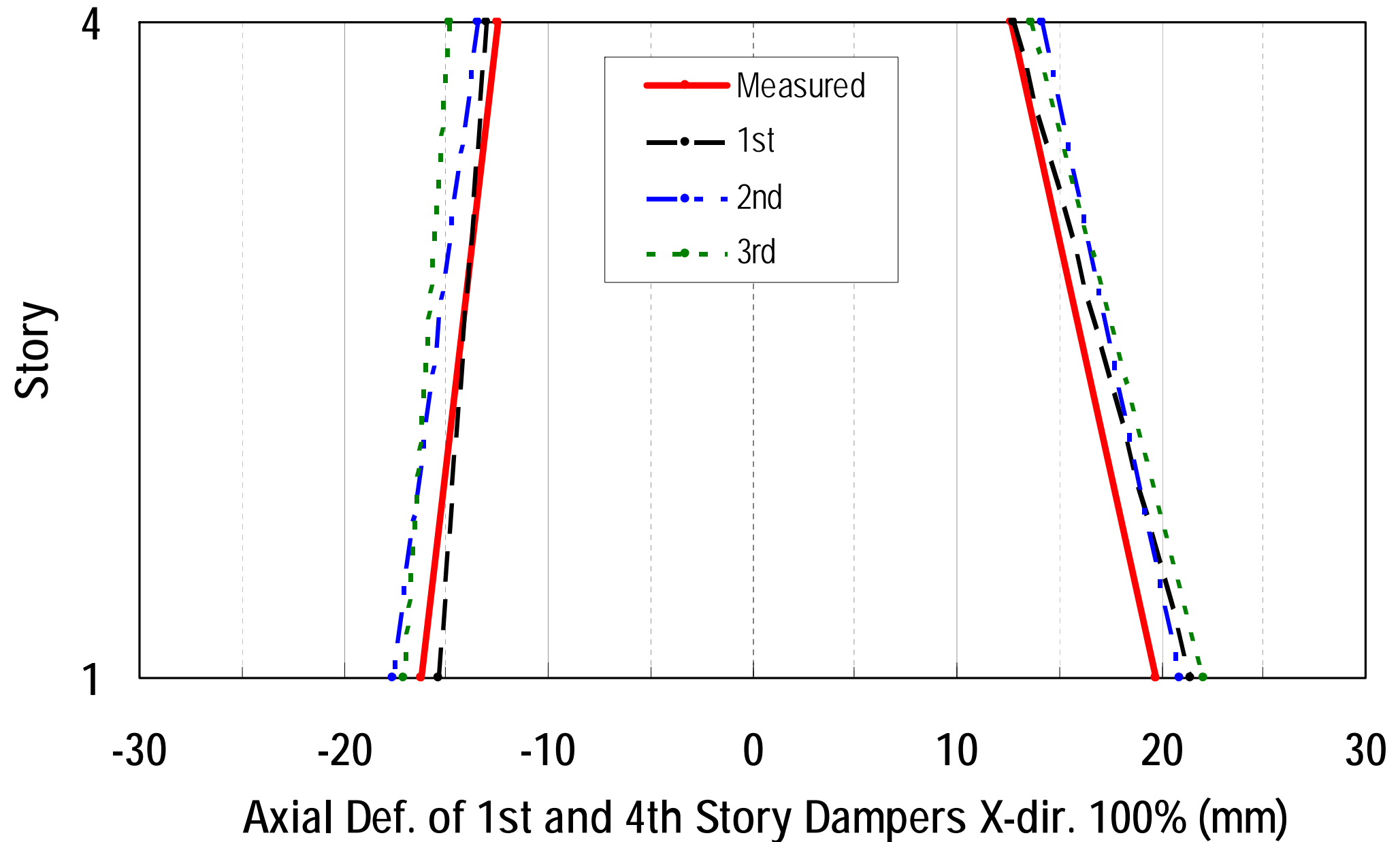


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



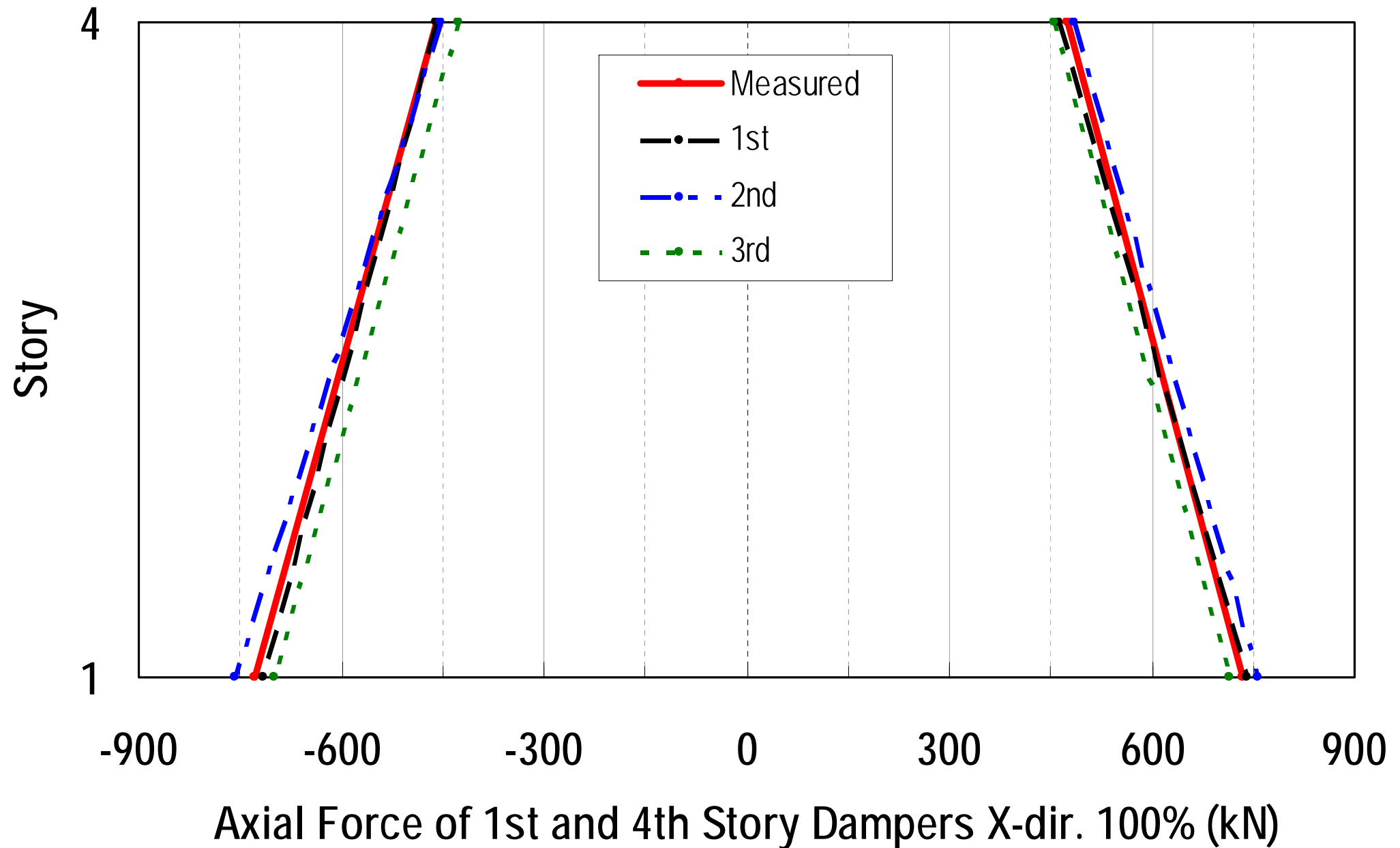


3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)





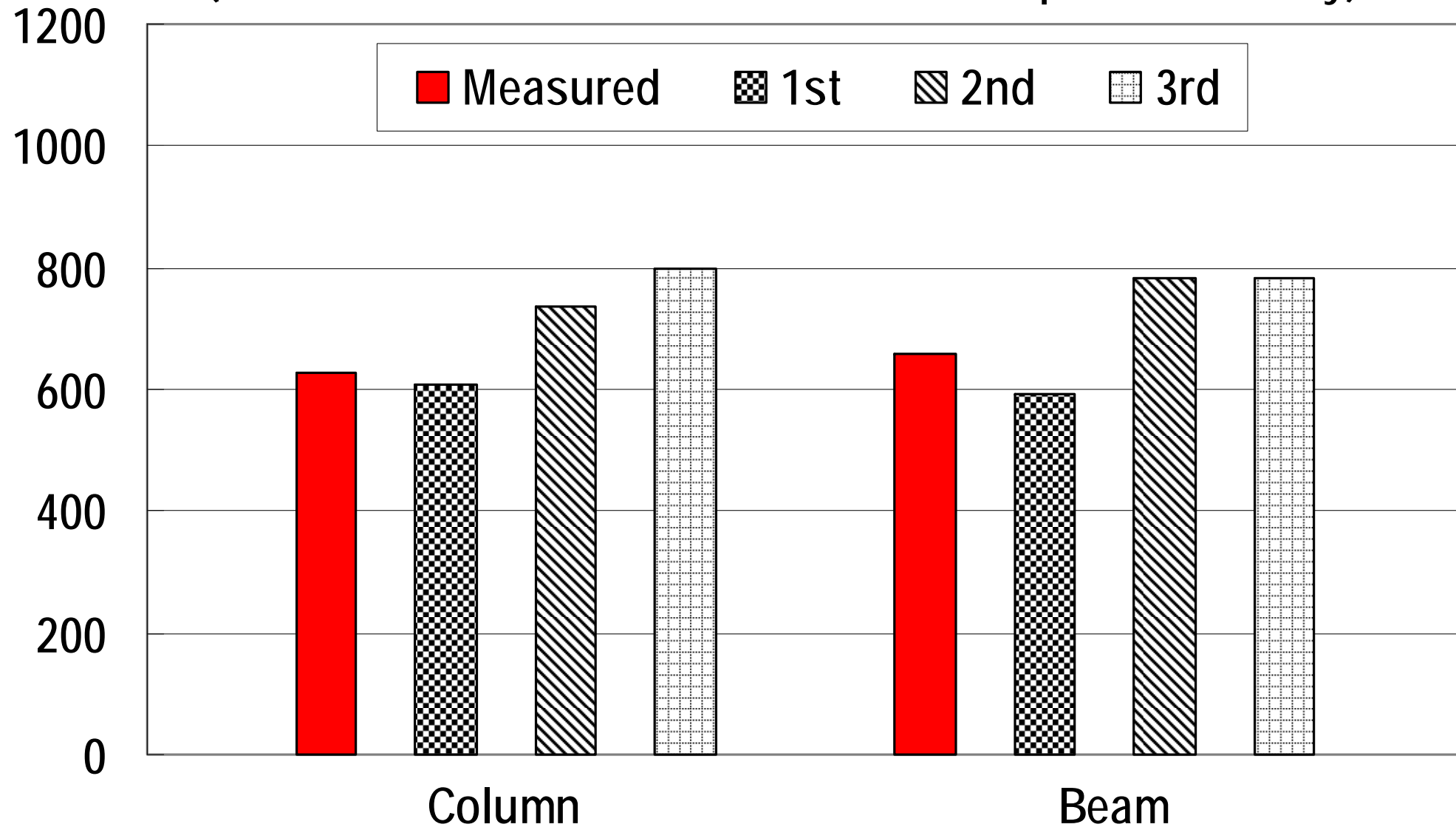
3D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)





3D Steel Damper Blind Analysis Prediction Results

(μ) (Measured and Best 3 Teams of Each Response Quantity)

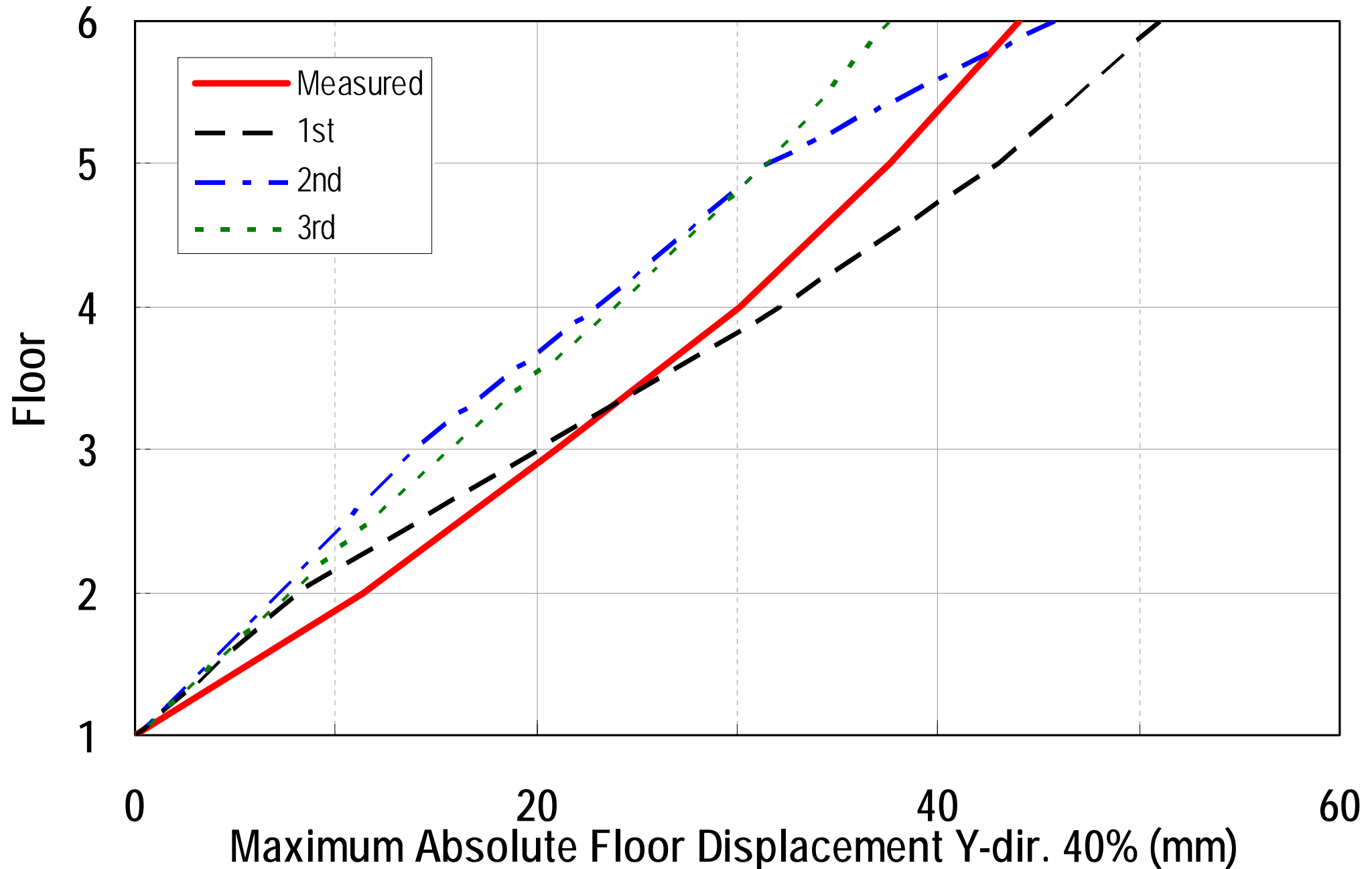


Axial Strain at the Designated Points of Colum and Beam 100%

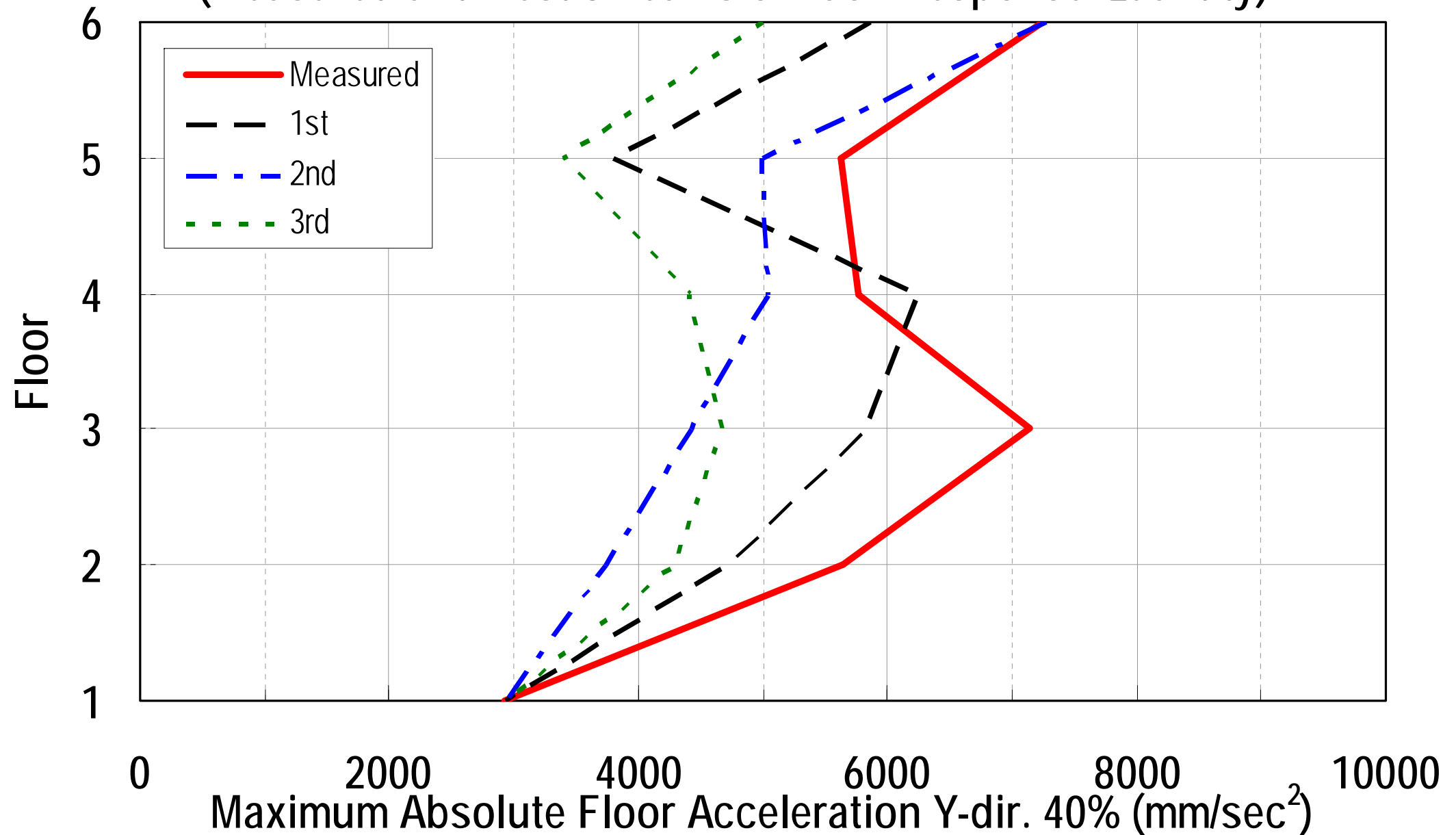


Category 2 : 3D Analysis Viscous Damper (Measured and Best 3 Teams of Each Response Quantity)

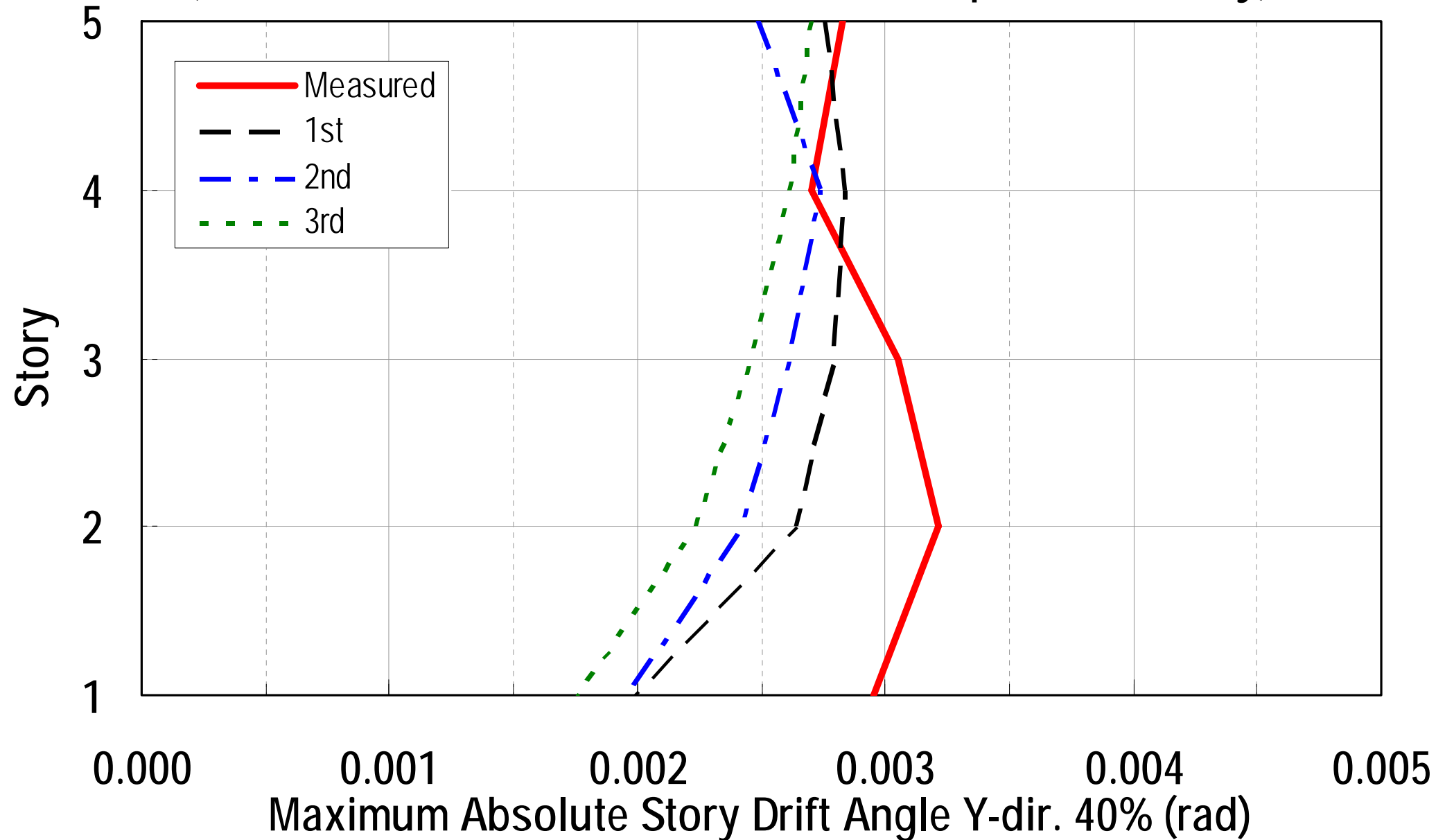
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



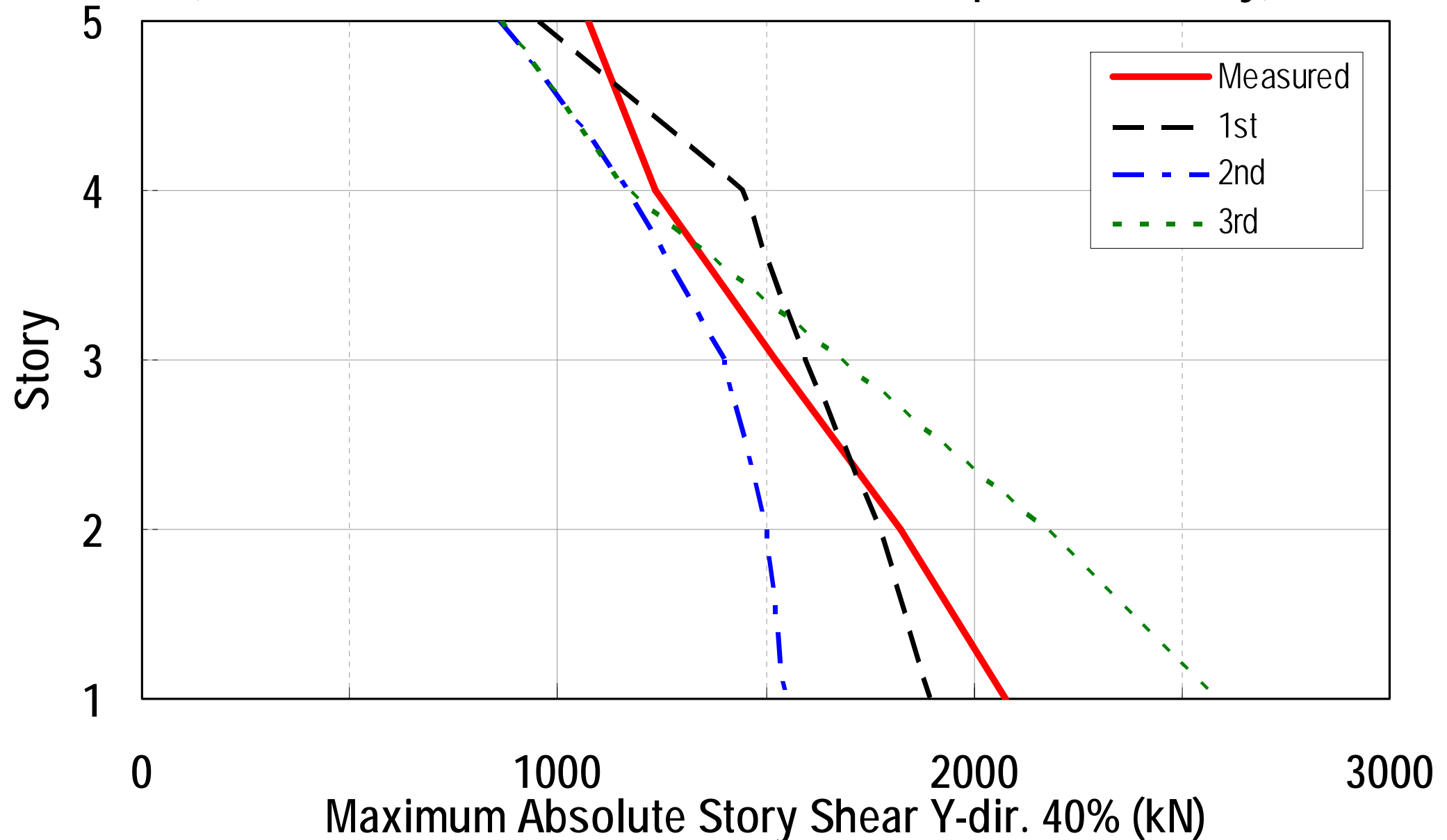
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



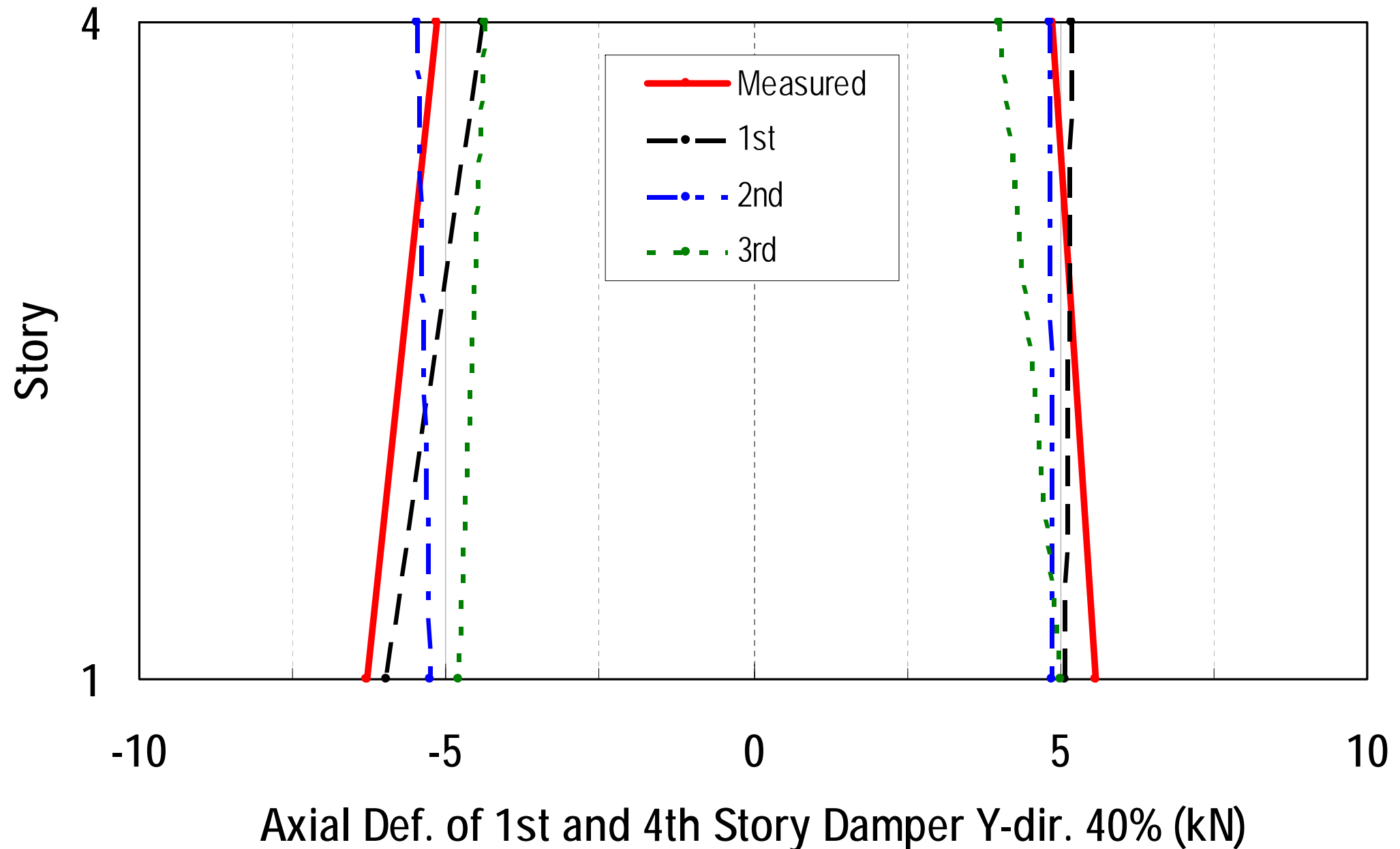
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



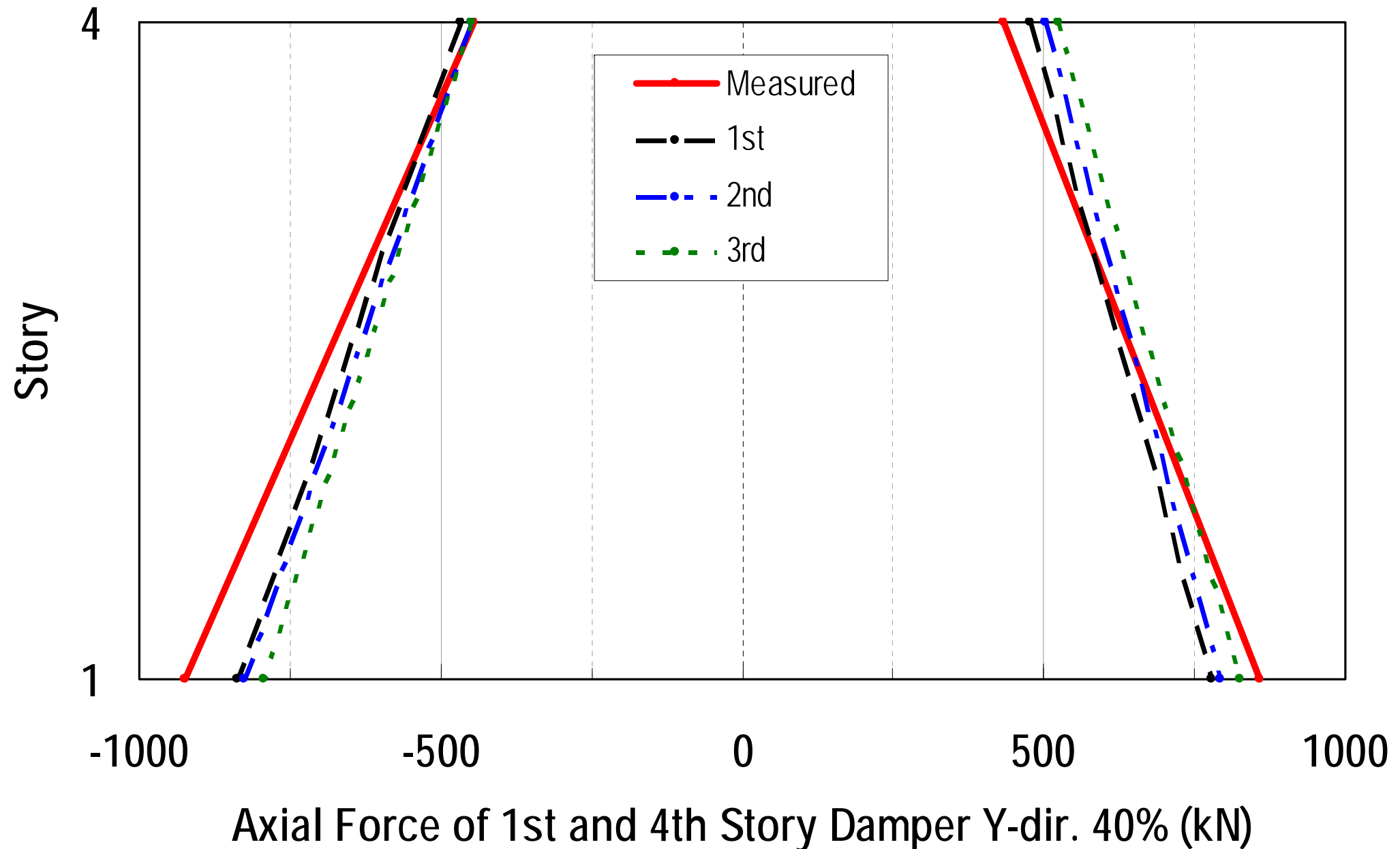
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



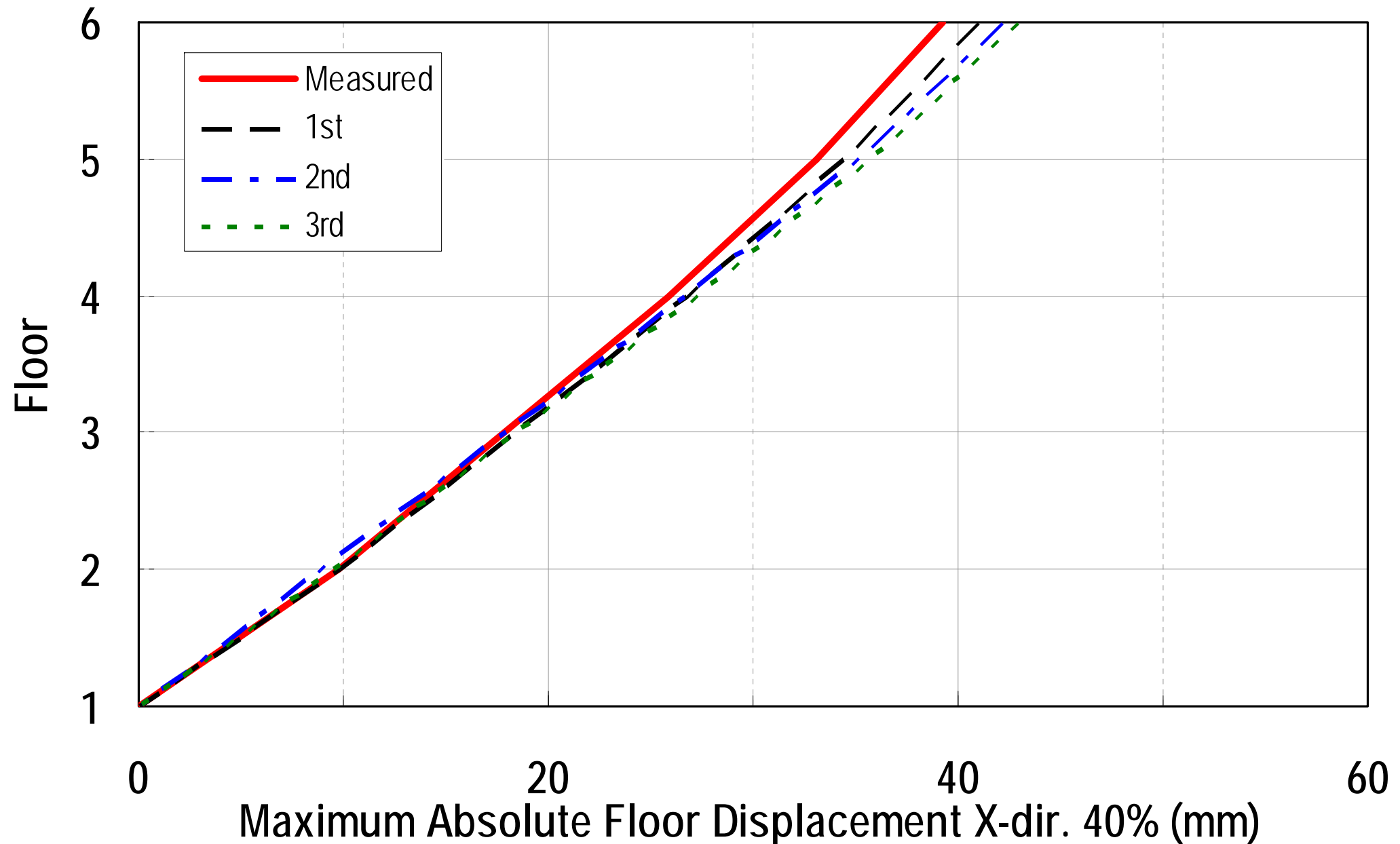
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)

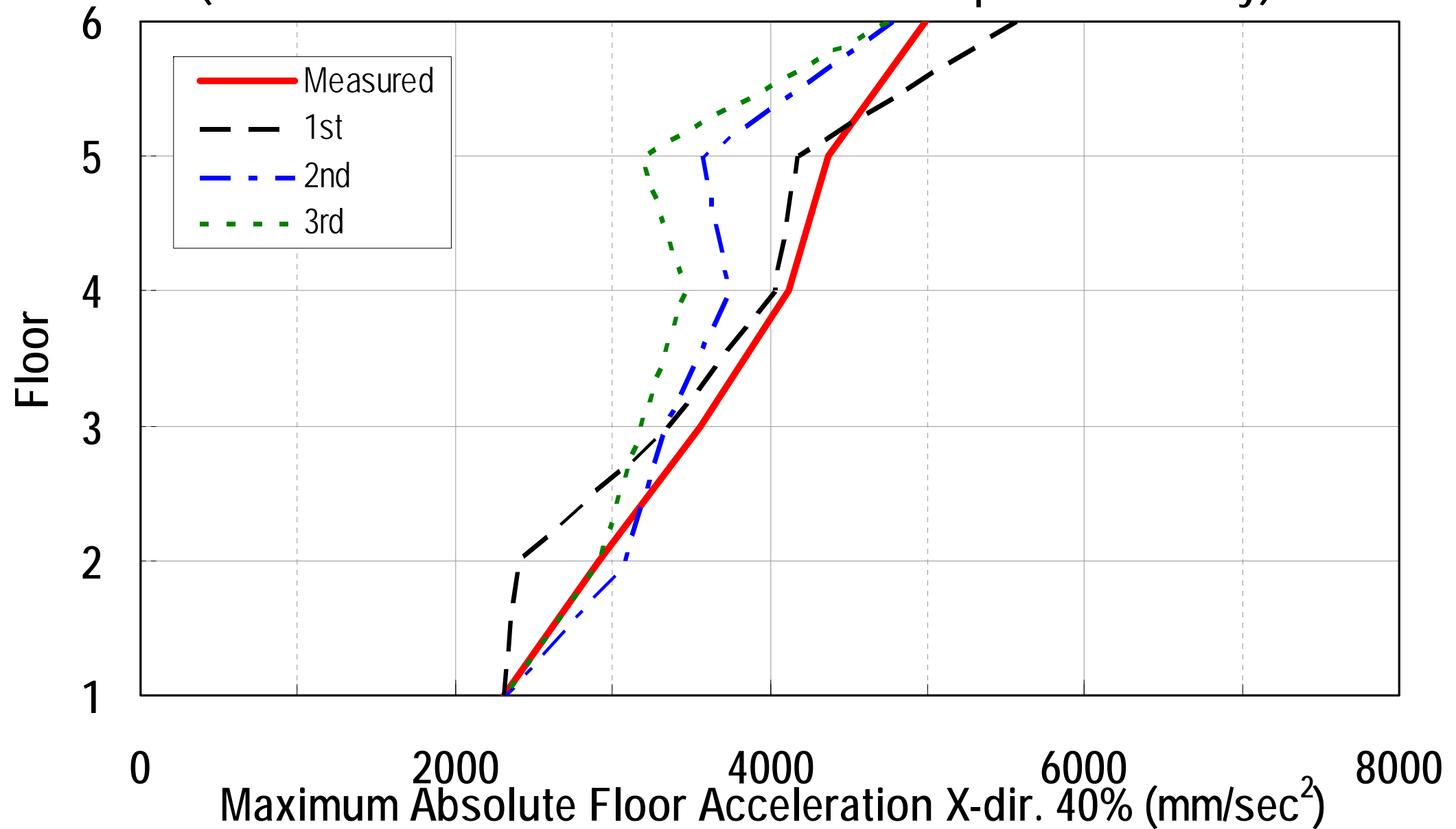


3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)

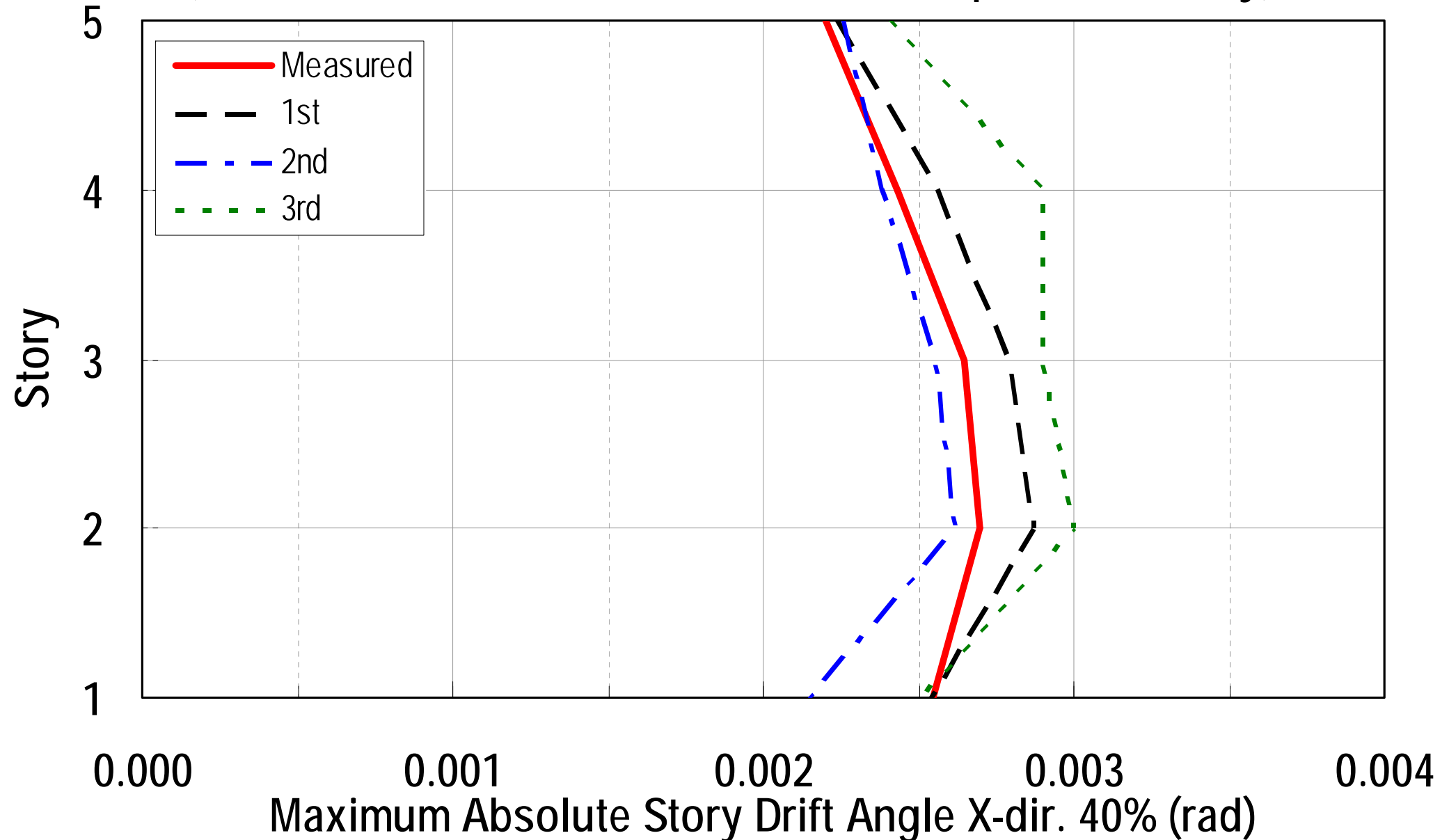




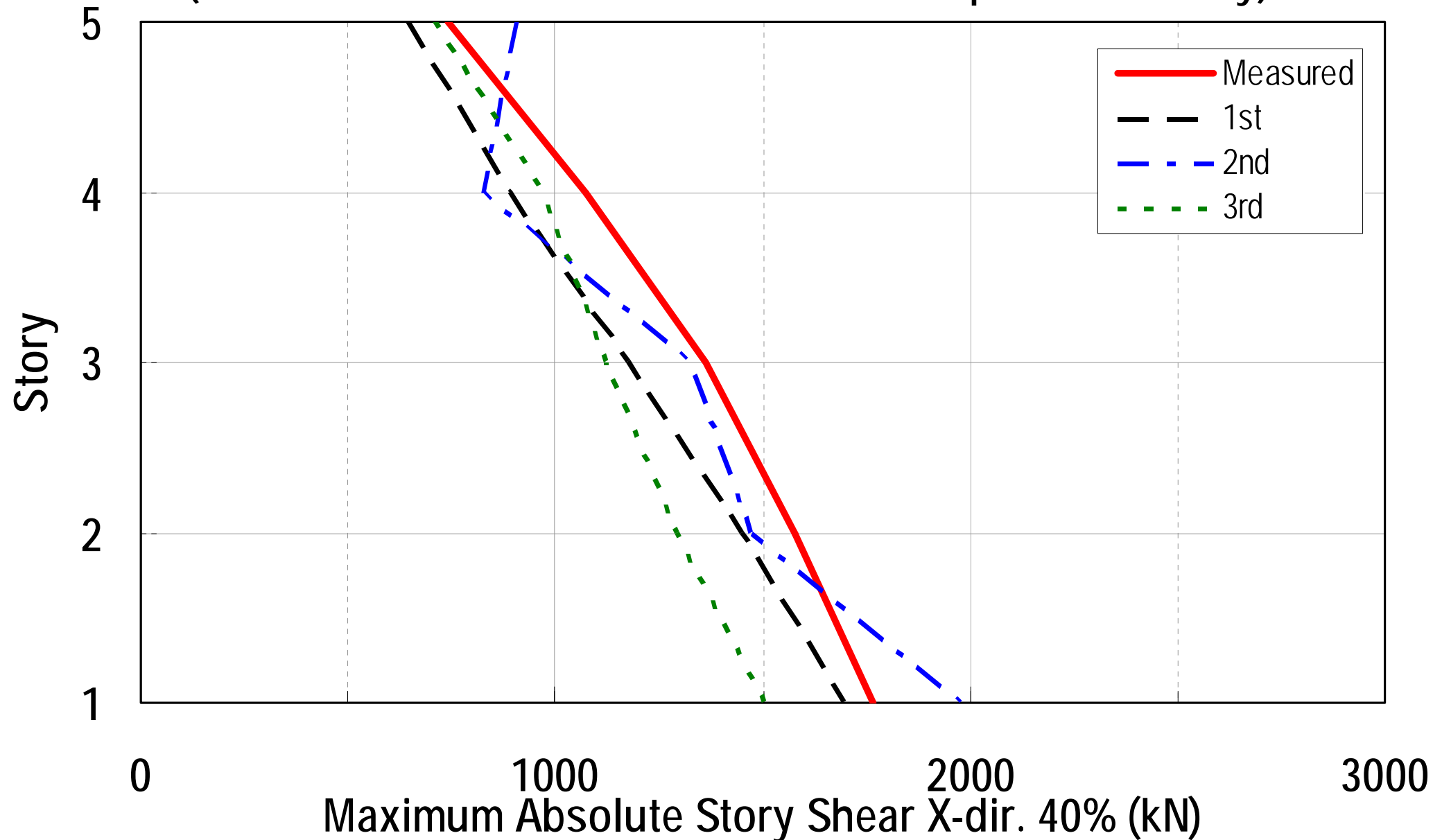
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



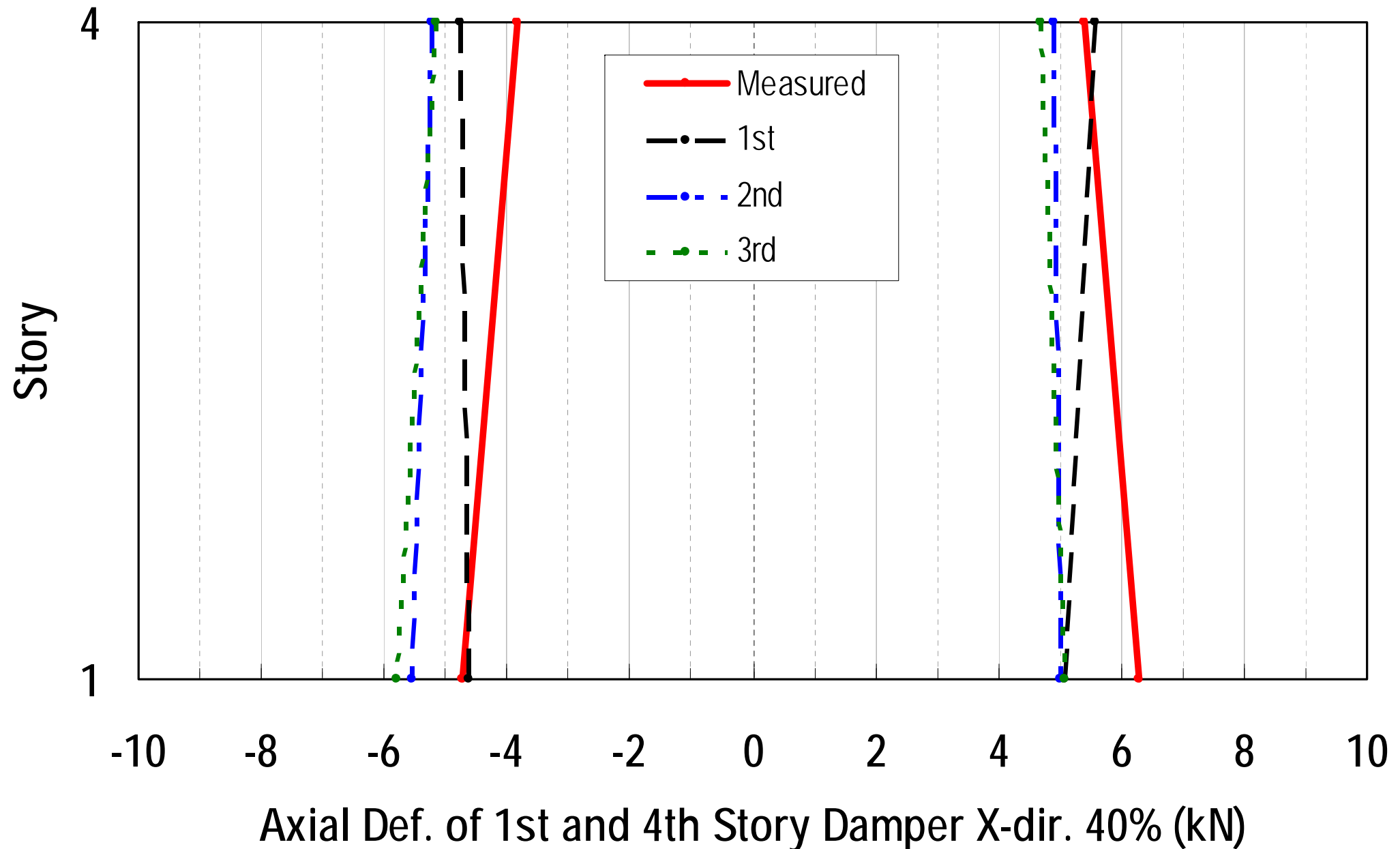
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



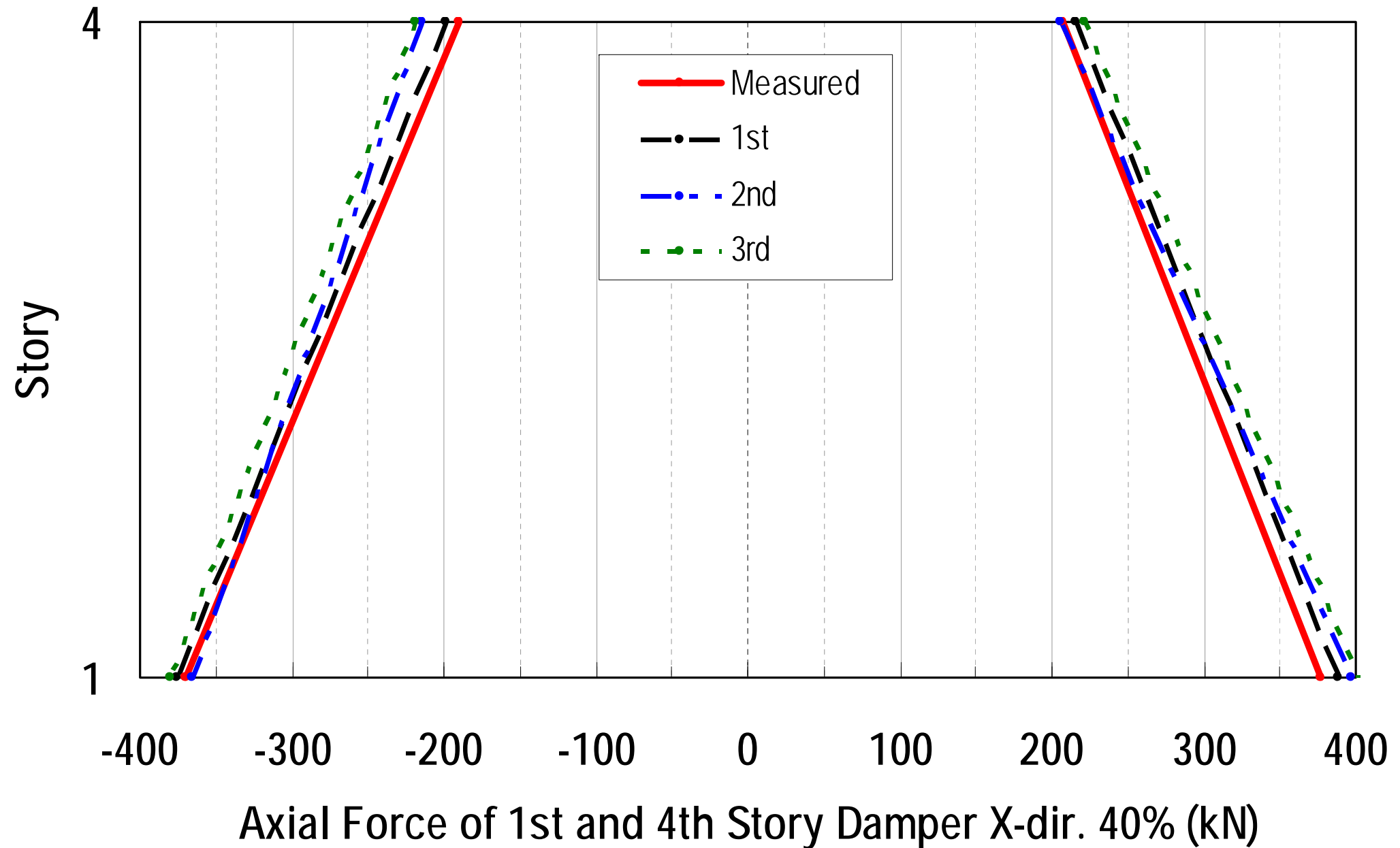
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



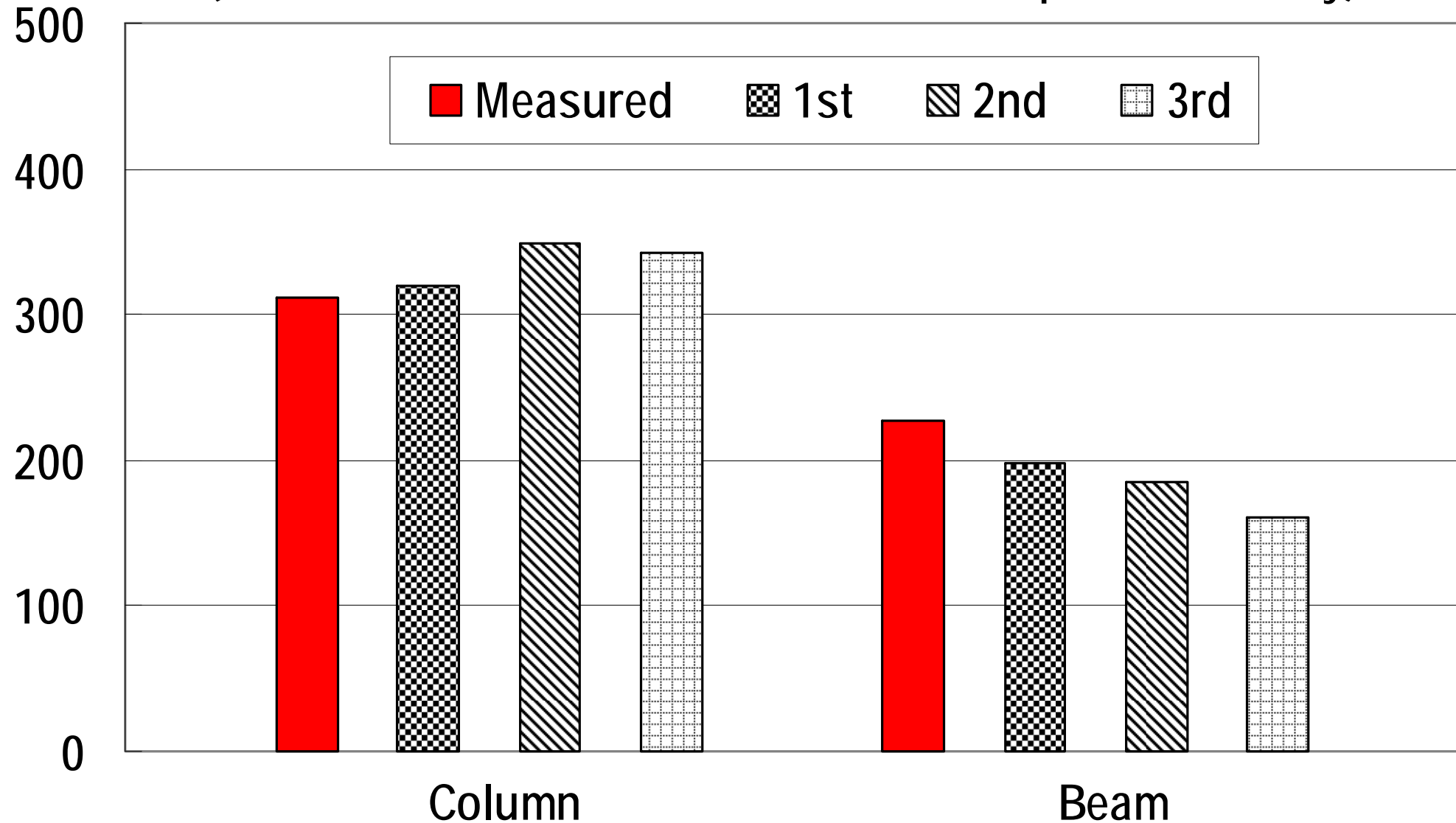
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)

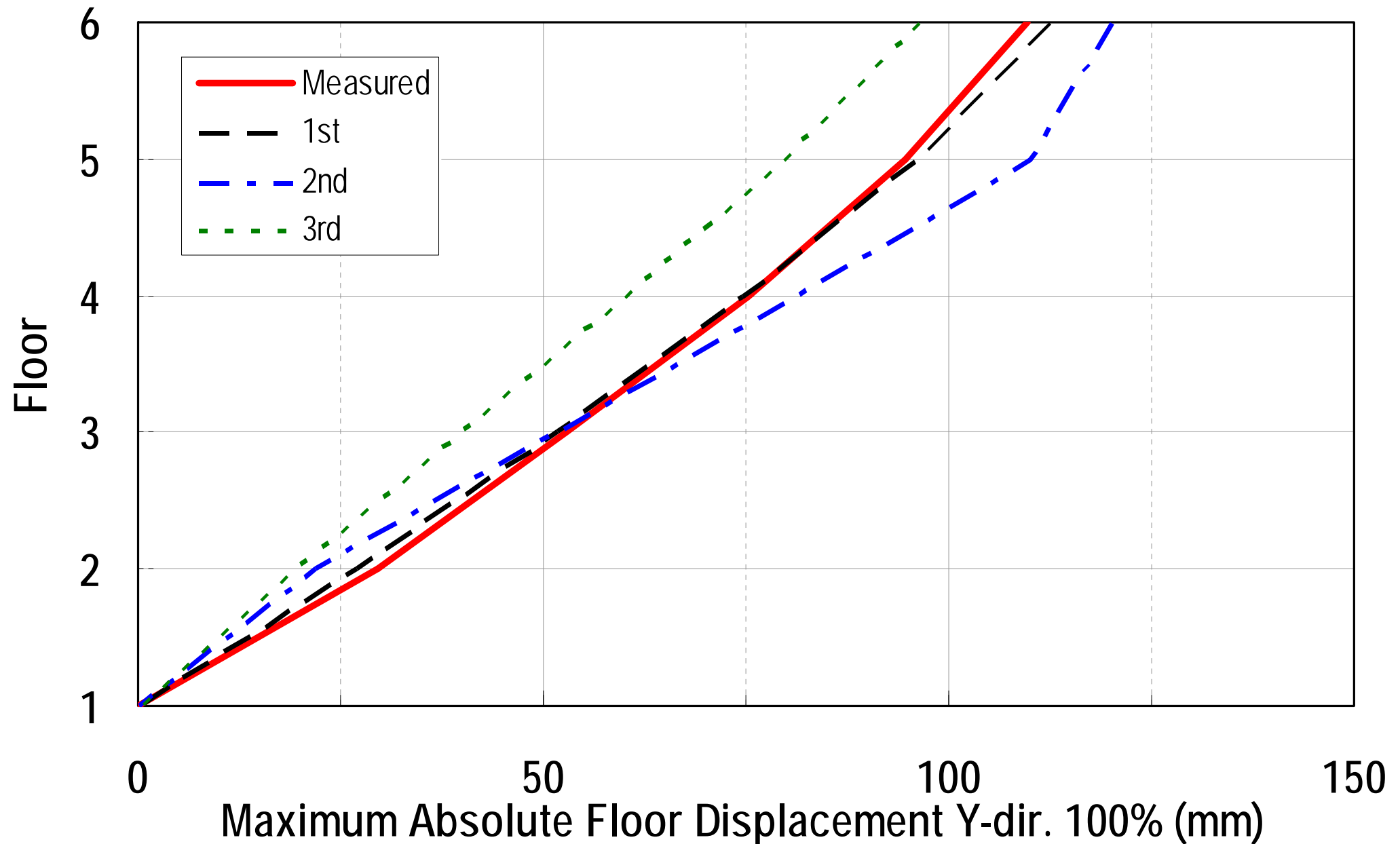


3D Viscous Damper Blind Analysis Prediction Results (μ) (Measured and Best 3 Teams of Each Response Quantity)

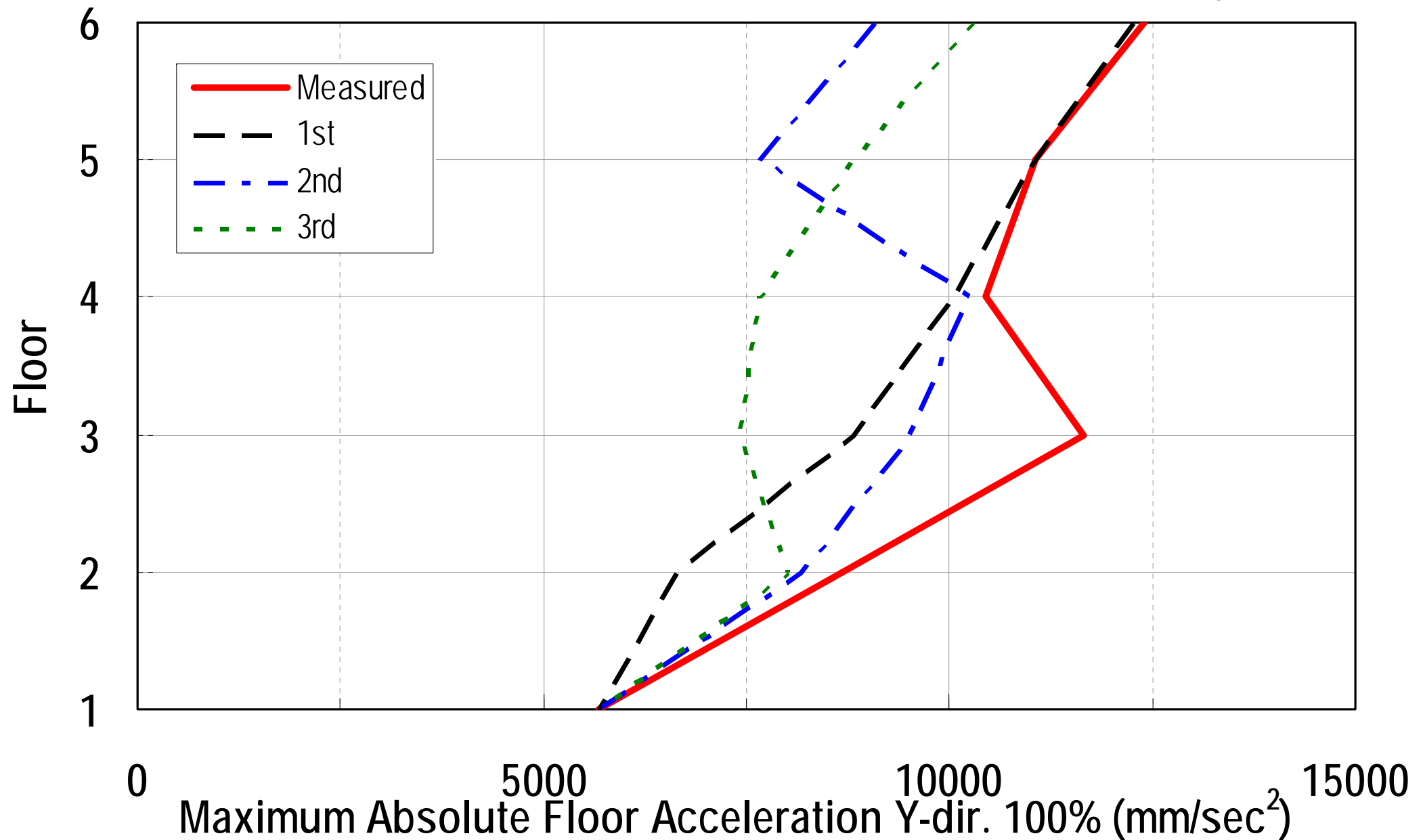


Axial Strain at the Designated Points of Colum and Beam 40%

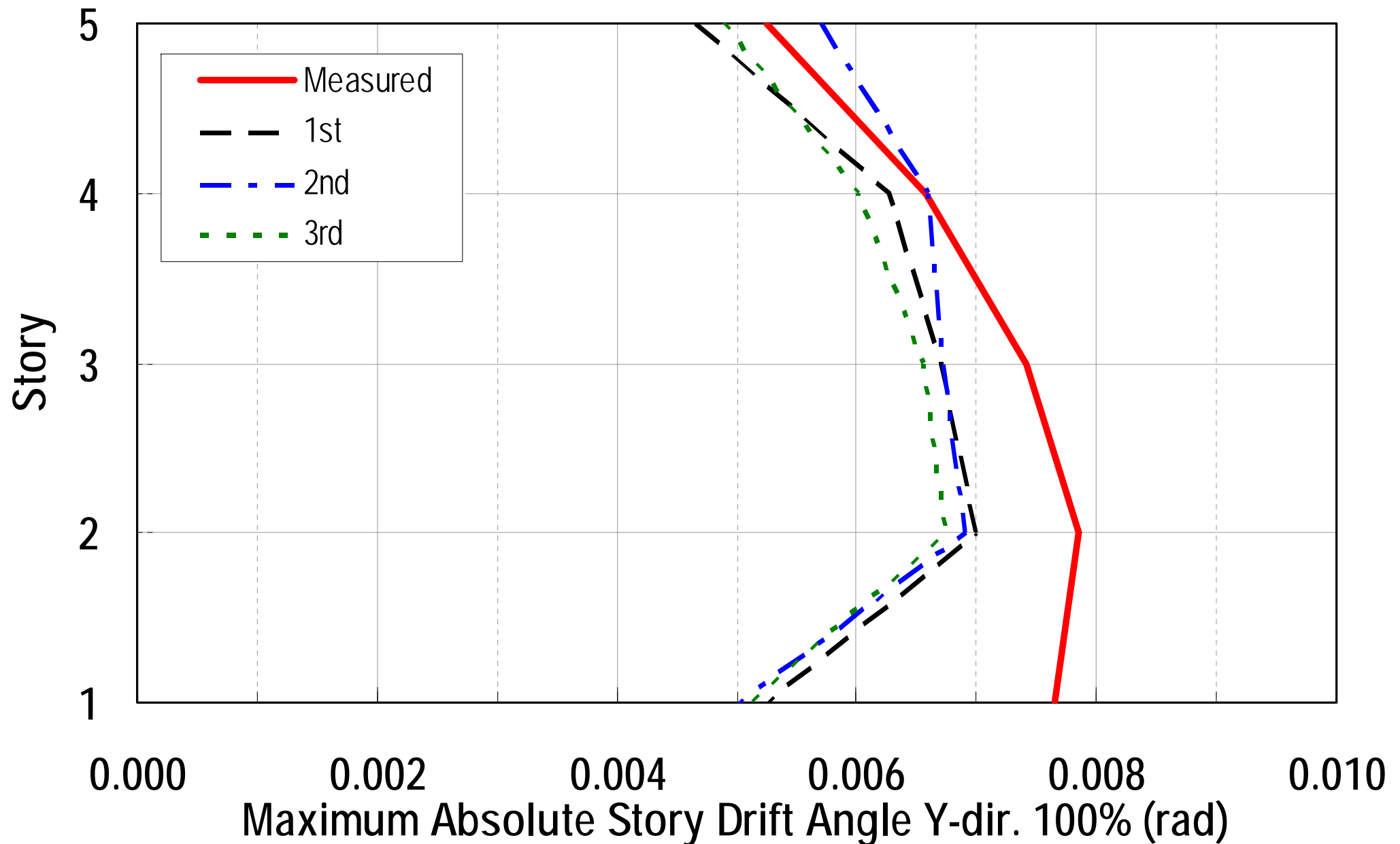
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



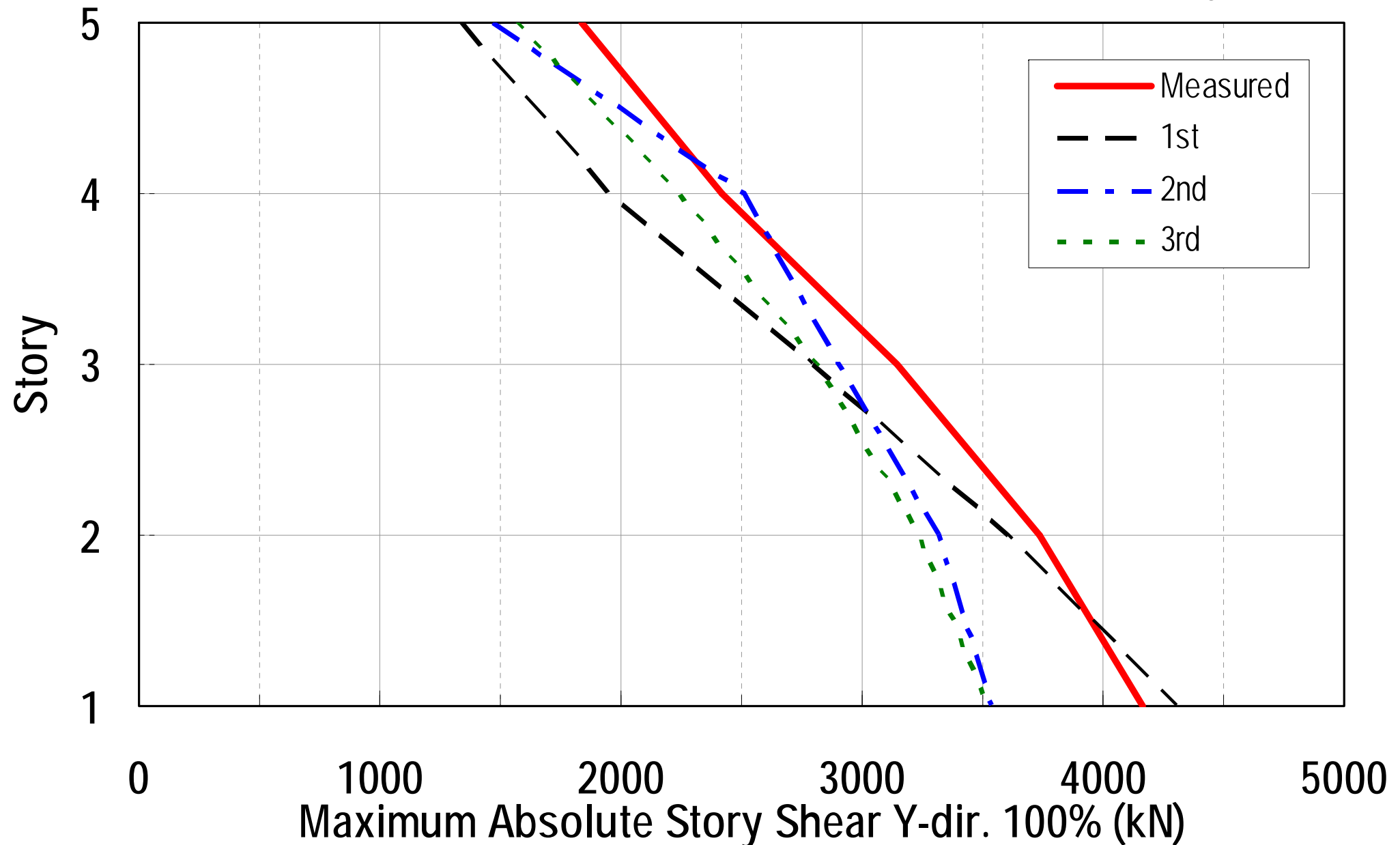
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



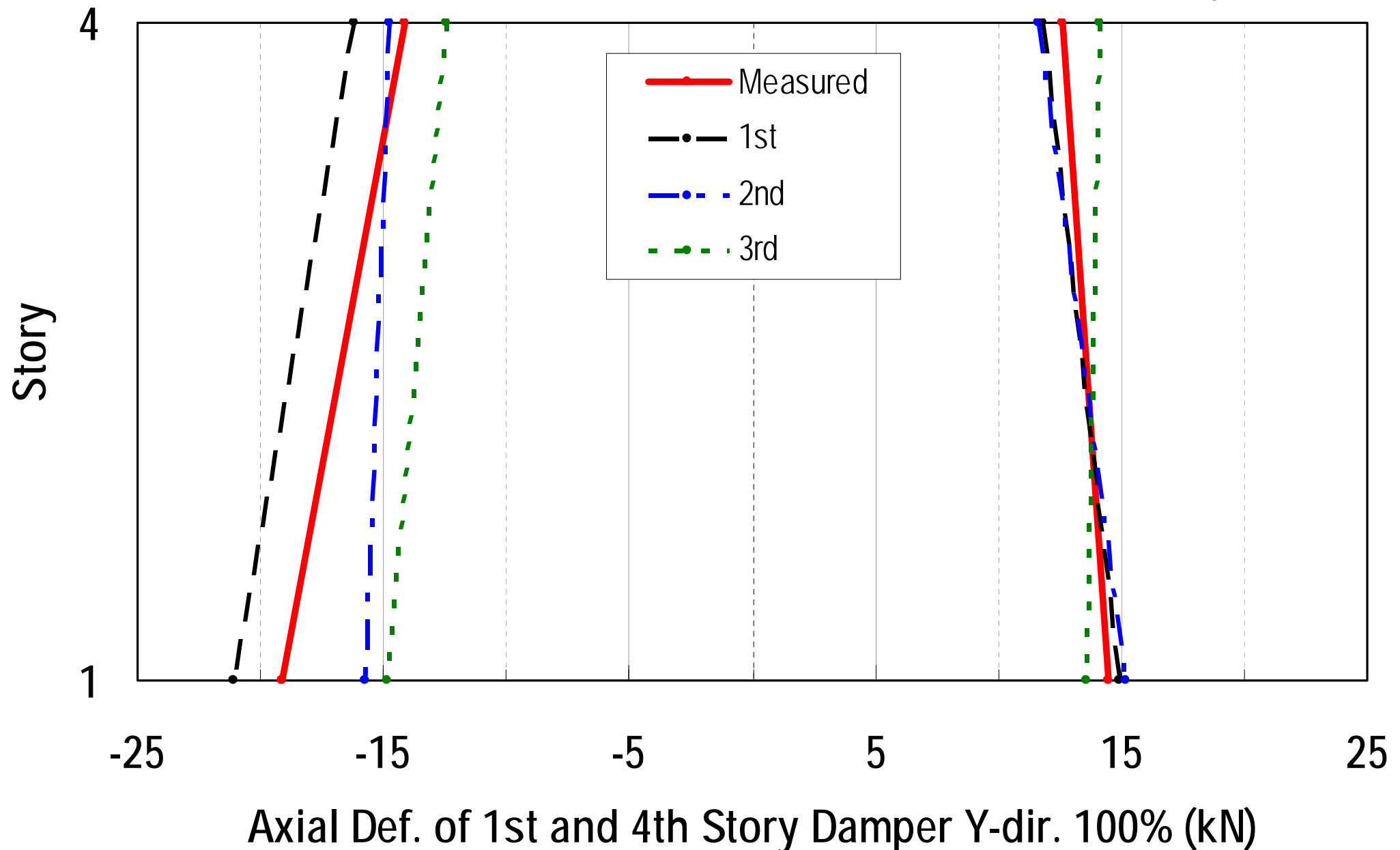
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



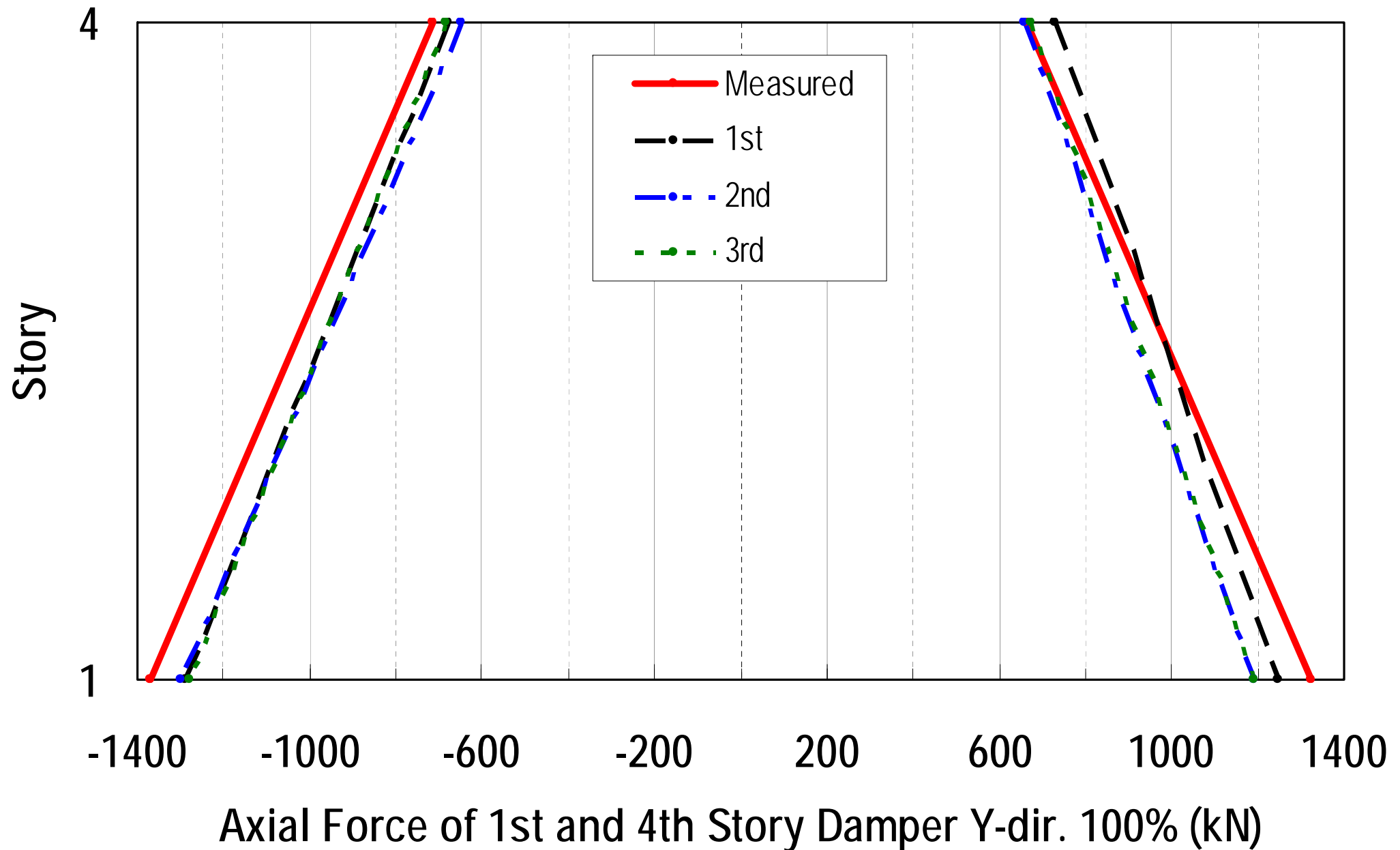
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



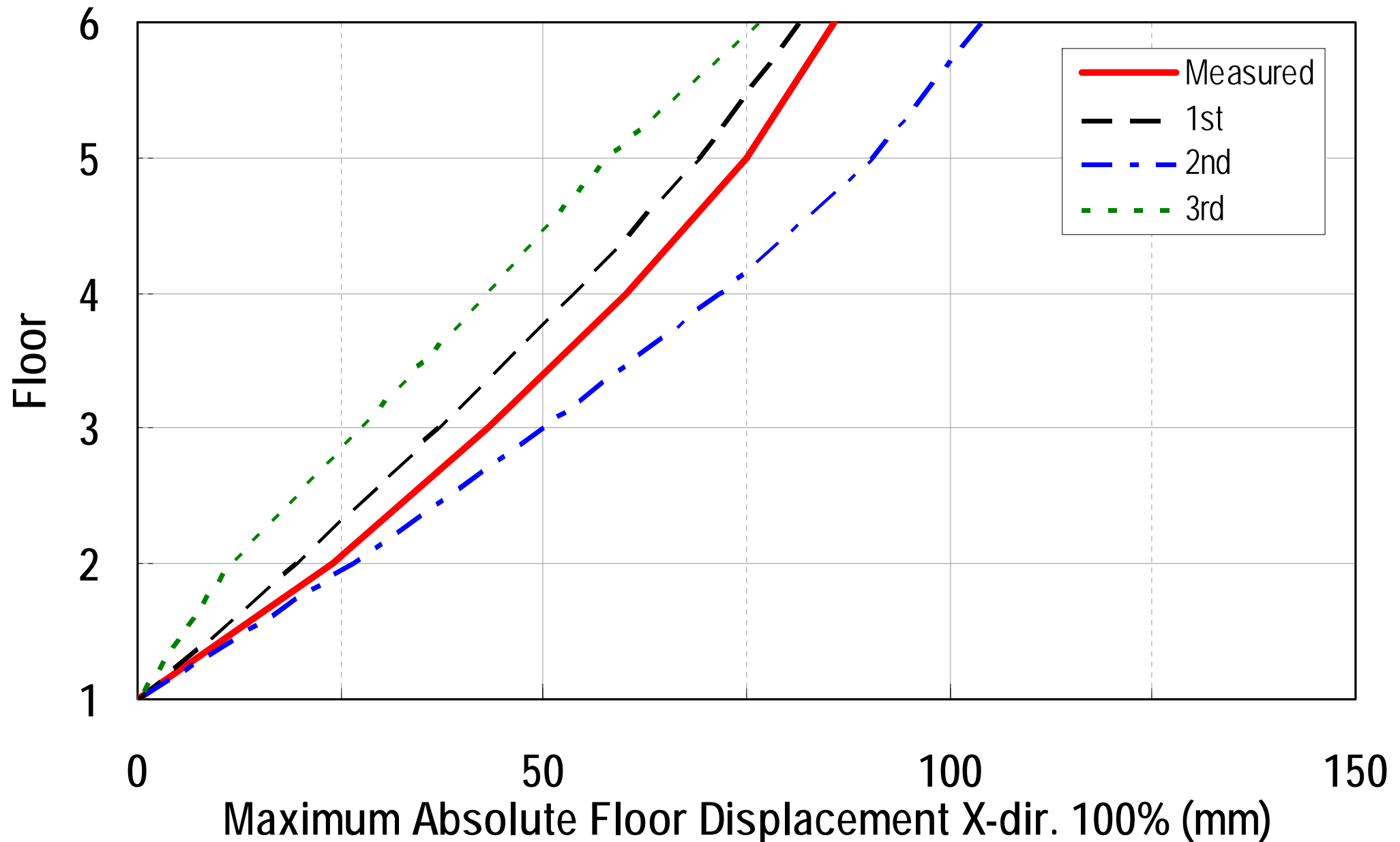
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



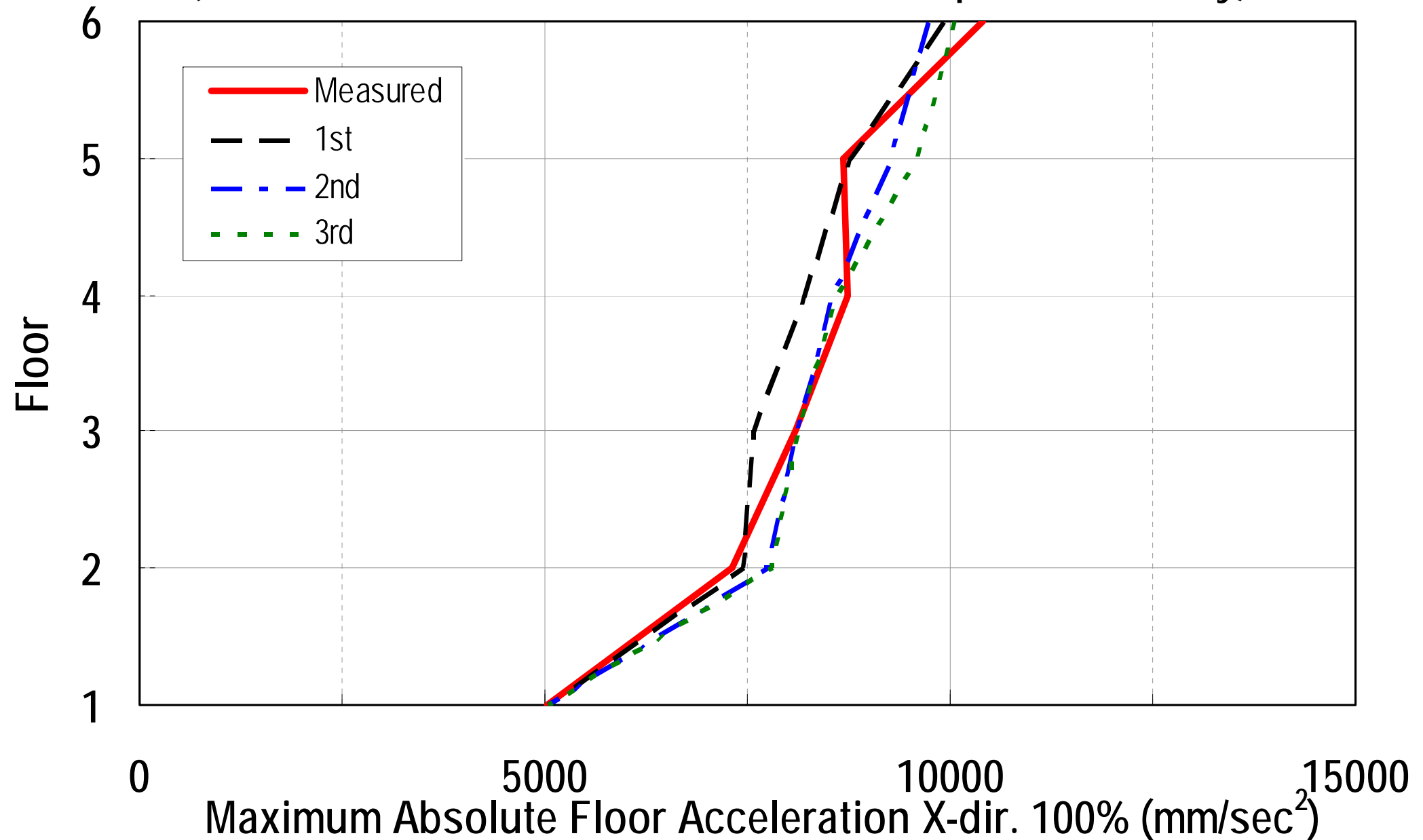
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



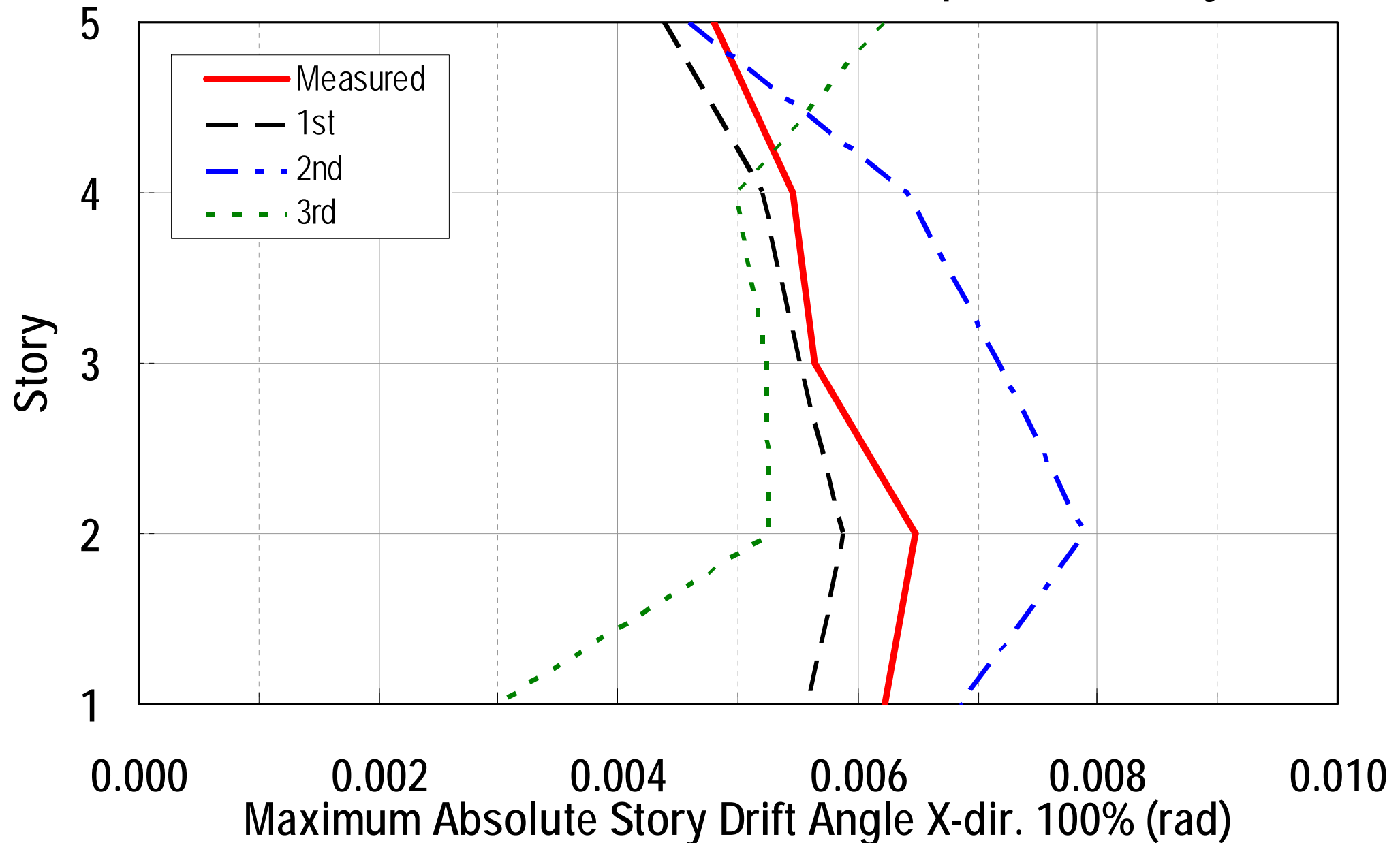
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)

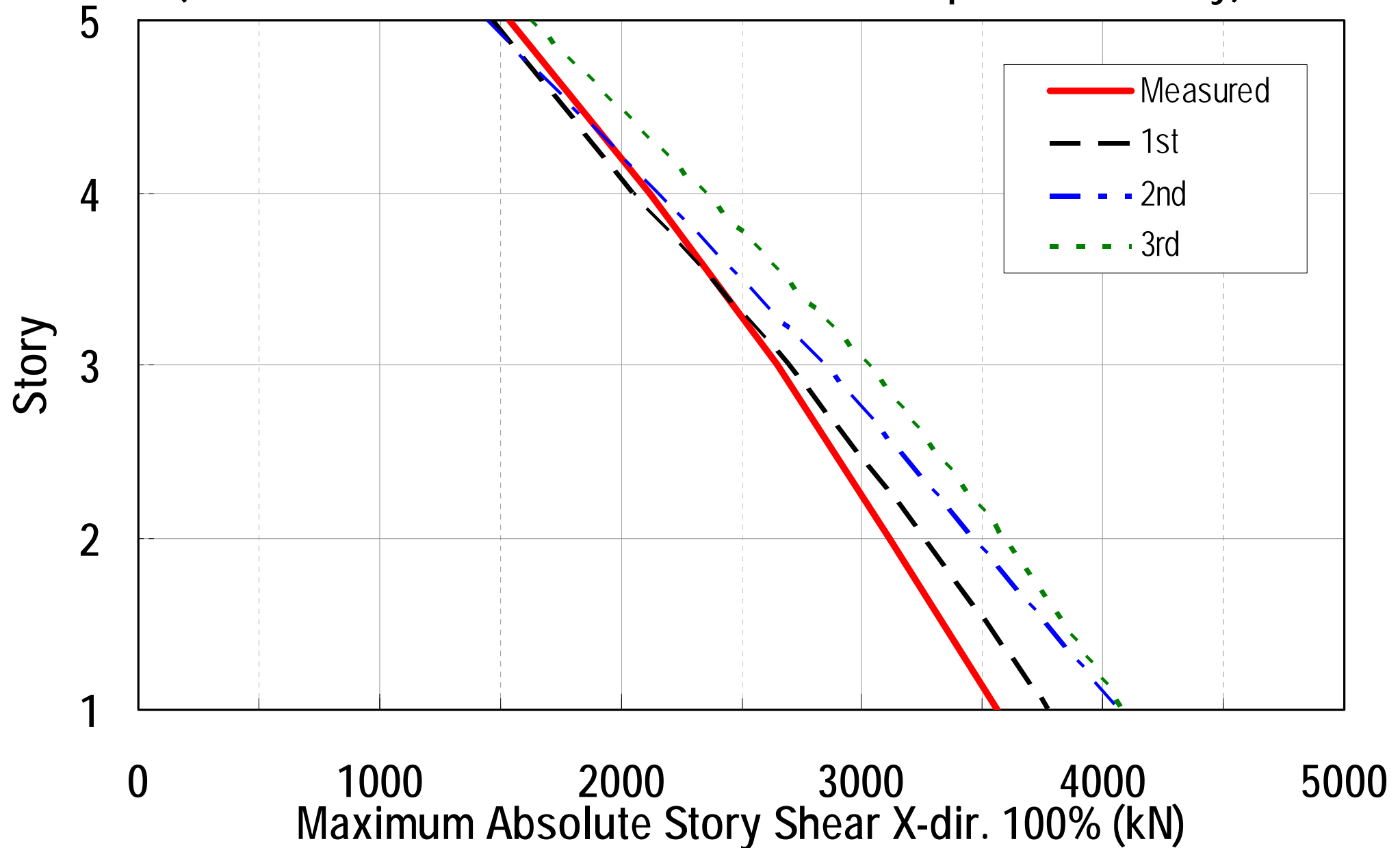


3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)

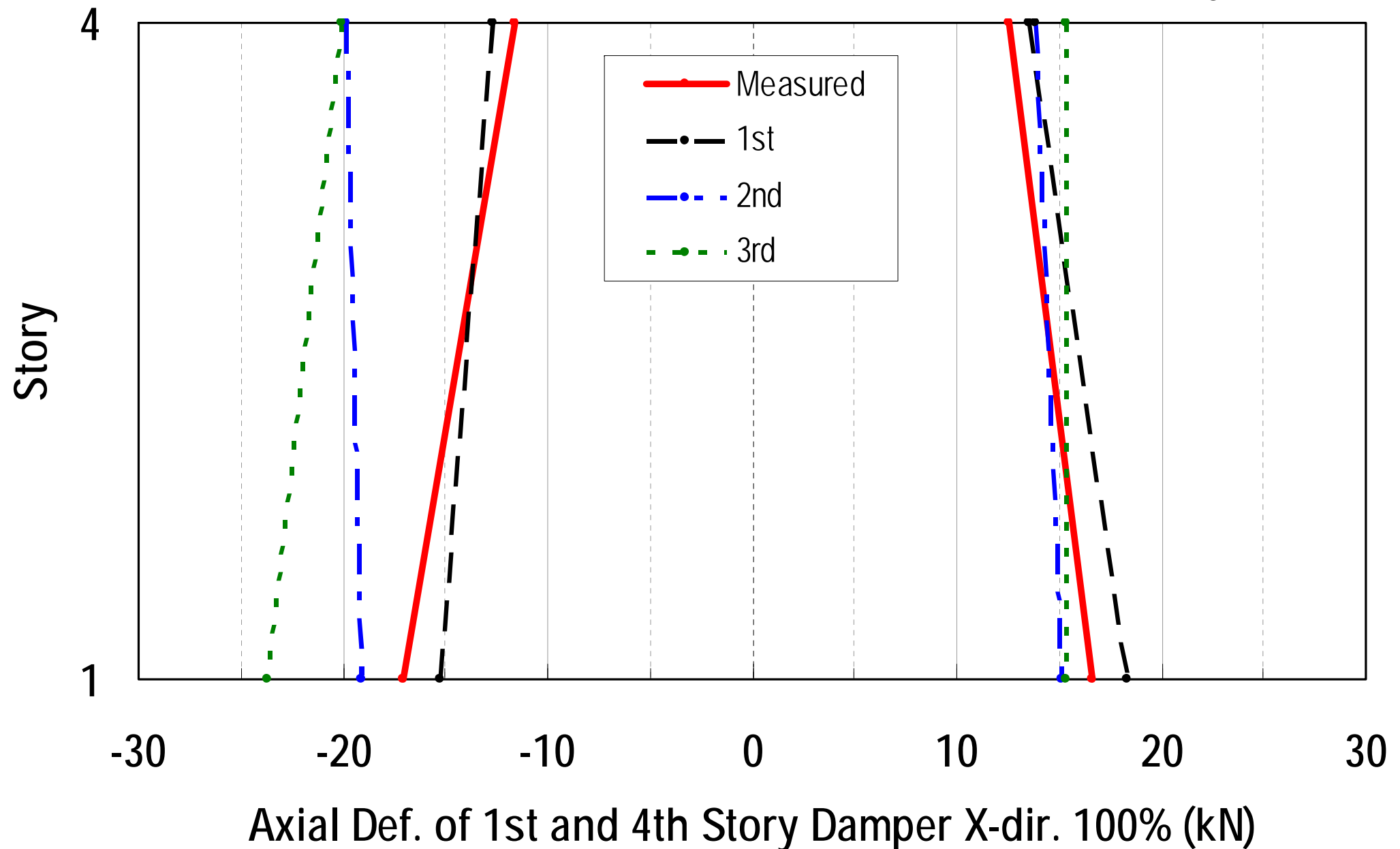




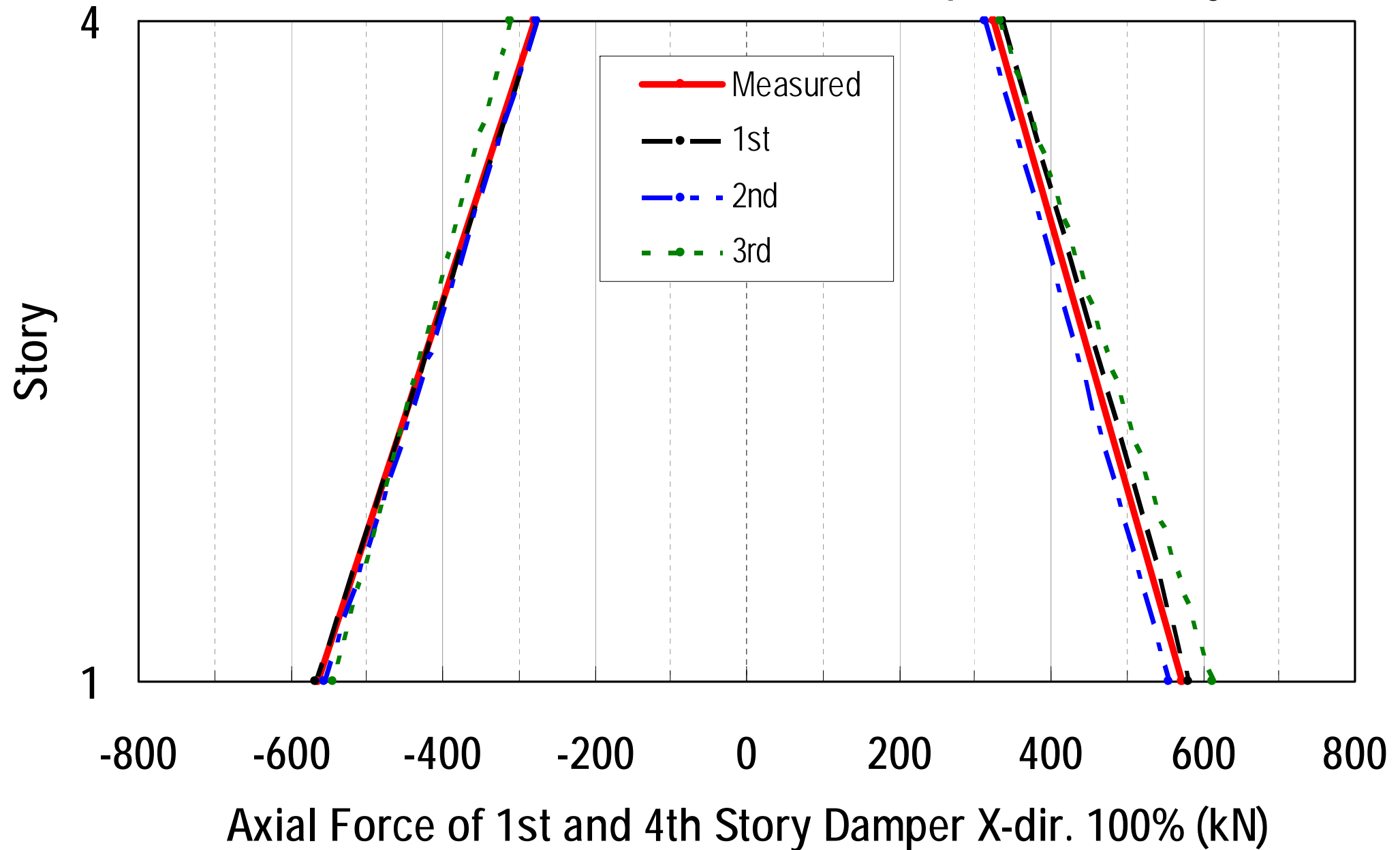
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



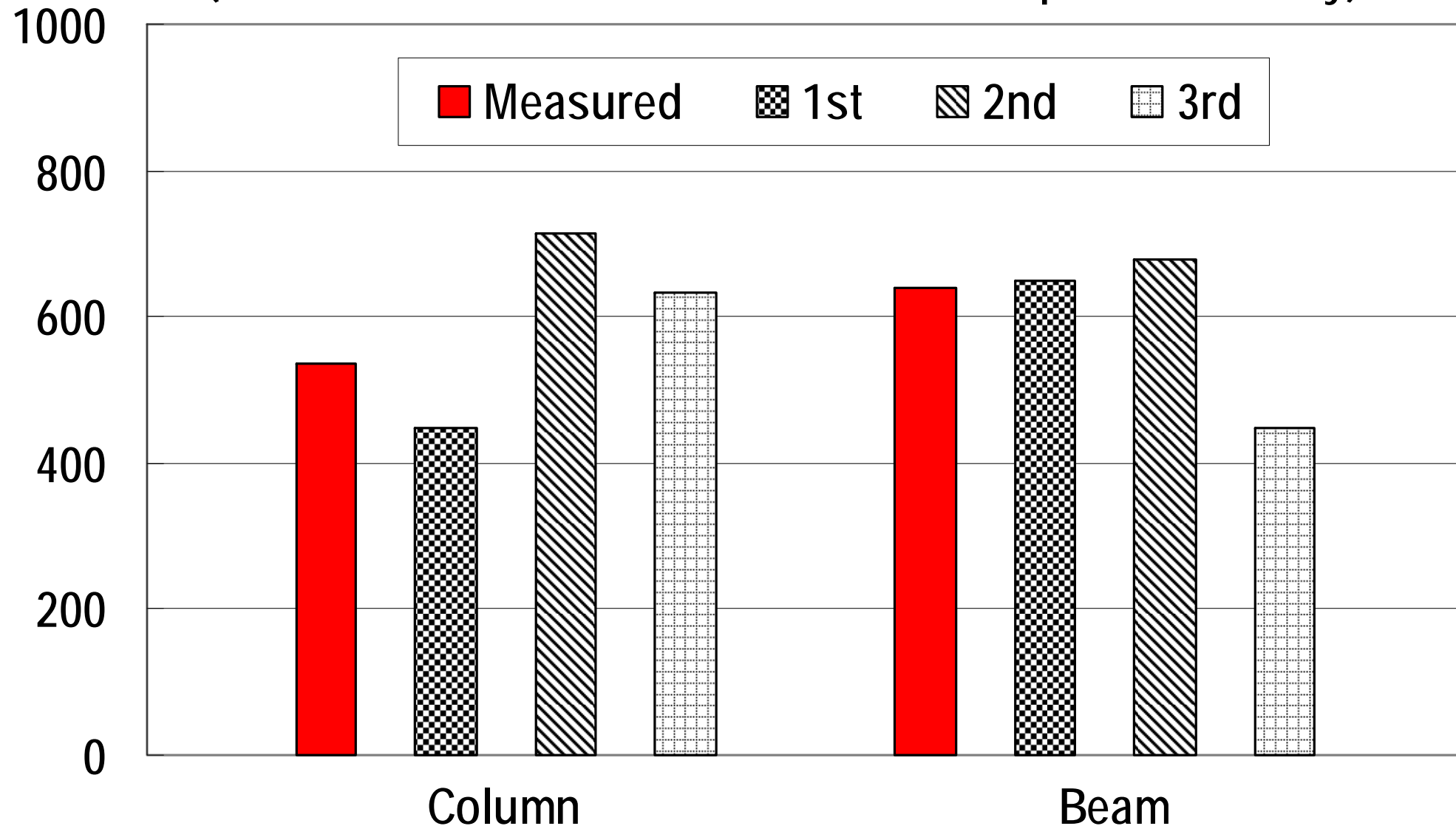
3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



3D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



3D Viscous Damper Blind Analysis Prediction Results (μ) (Measured and Best 3 Teams of Each Response Quantity)



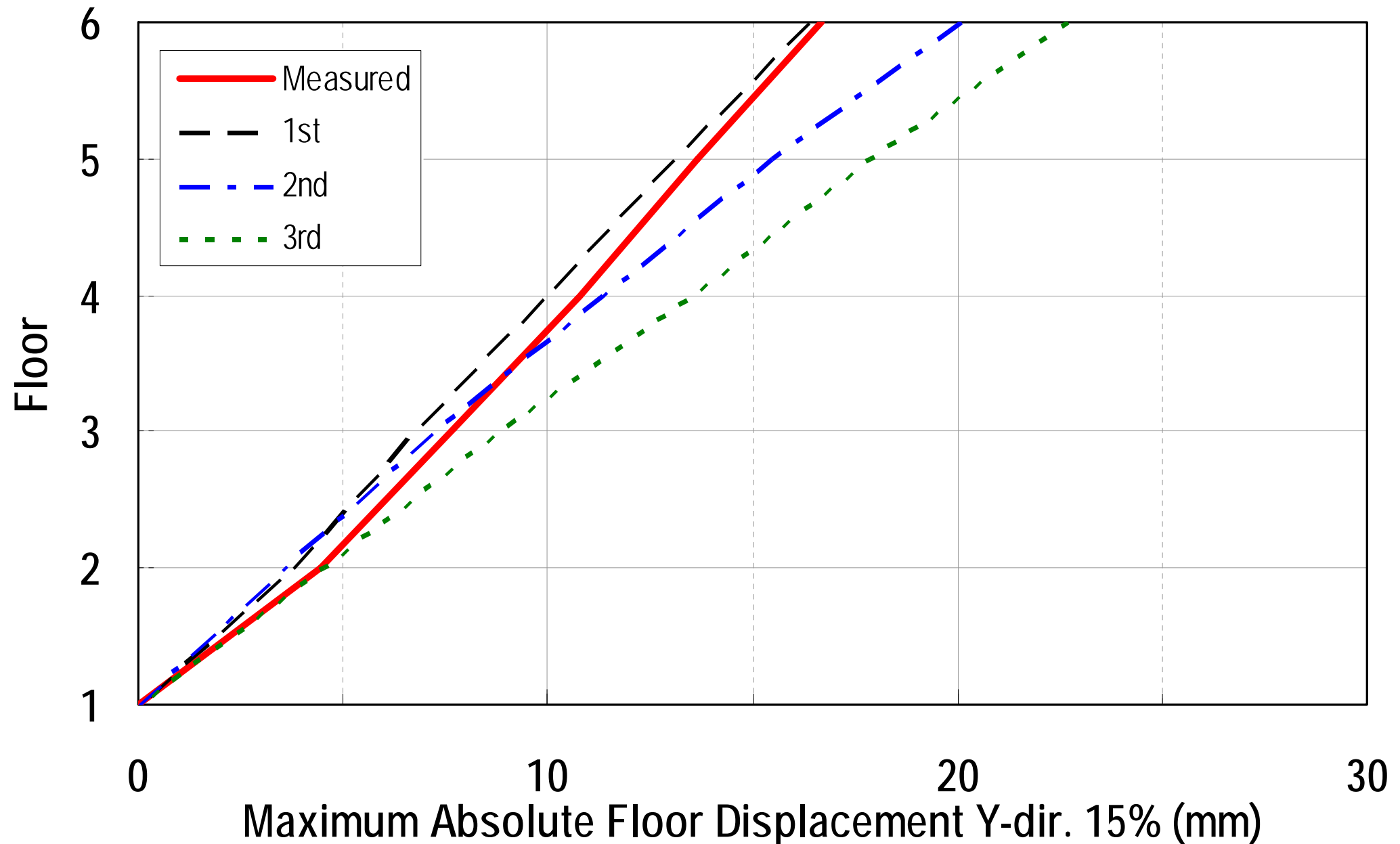
Axial Strain at the Designated Points of Colum and Beam 100%



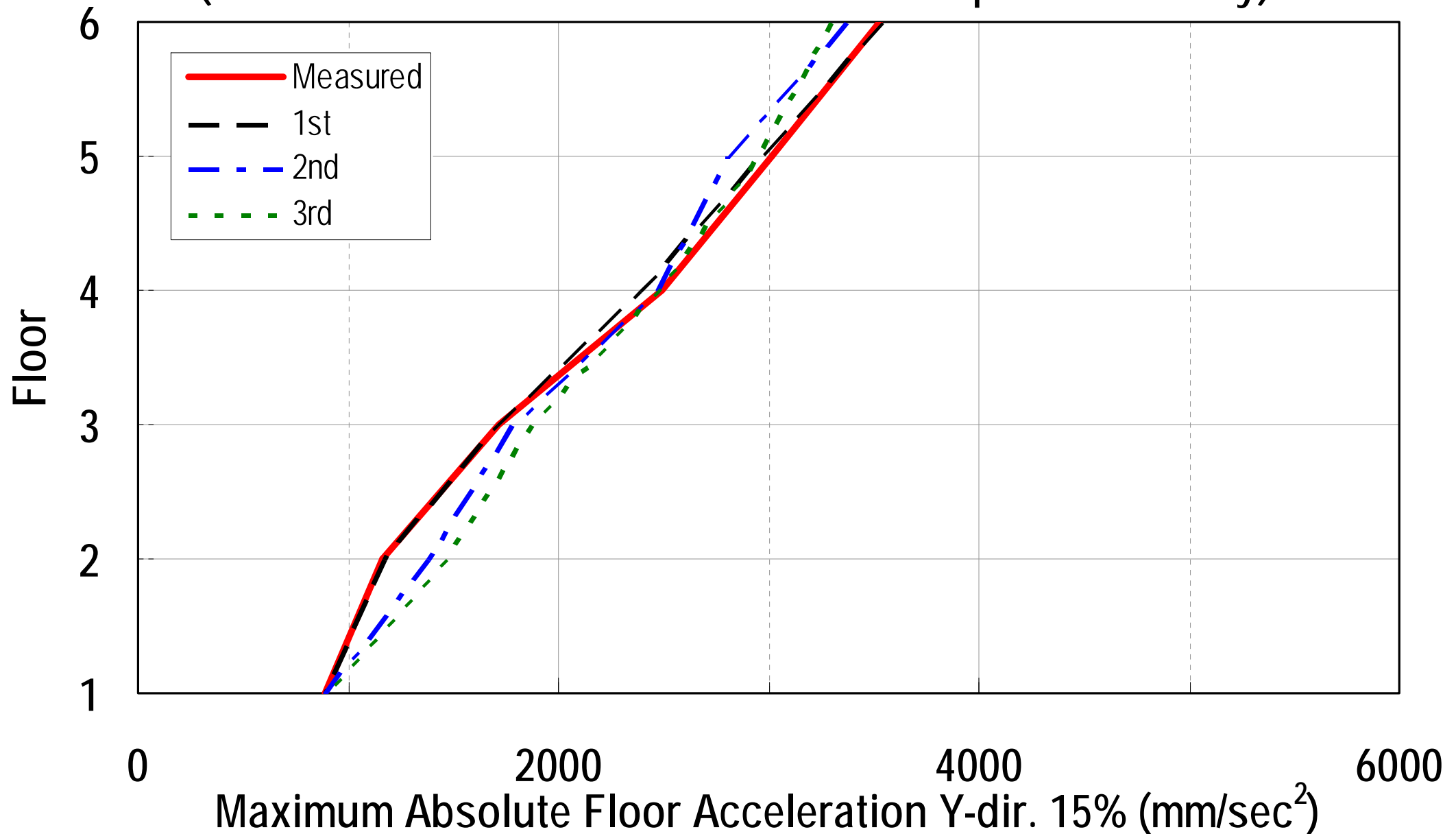
Category 3 : 2D Analysis Steel Damper

(Measured and Best 3 Teams of Each Response Quantity)

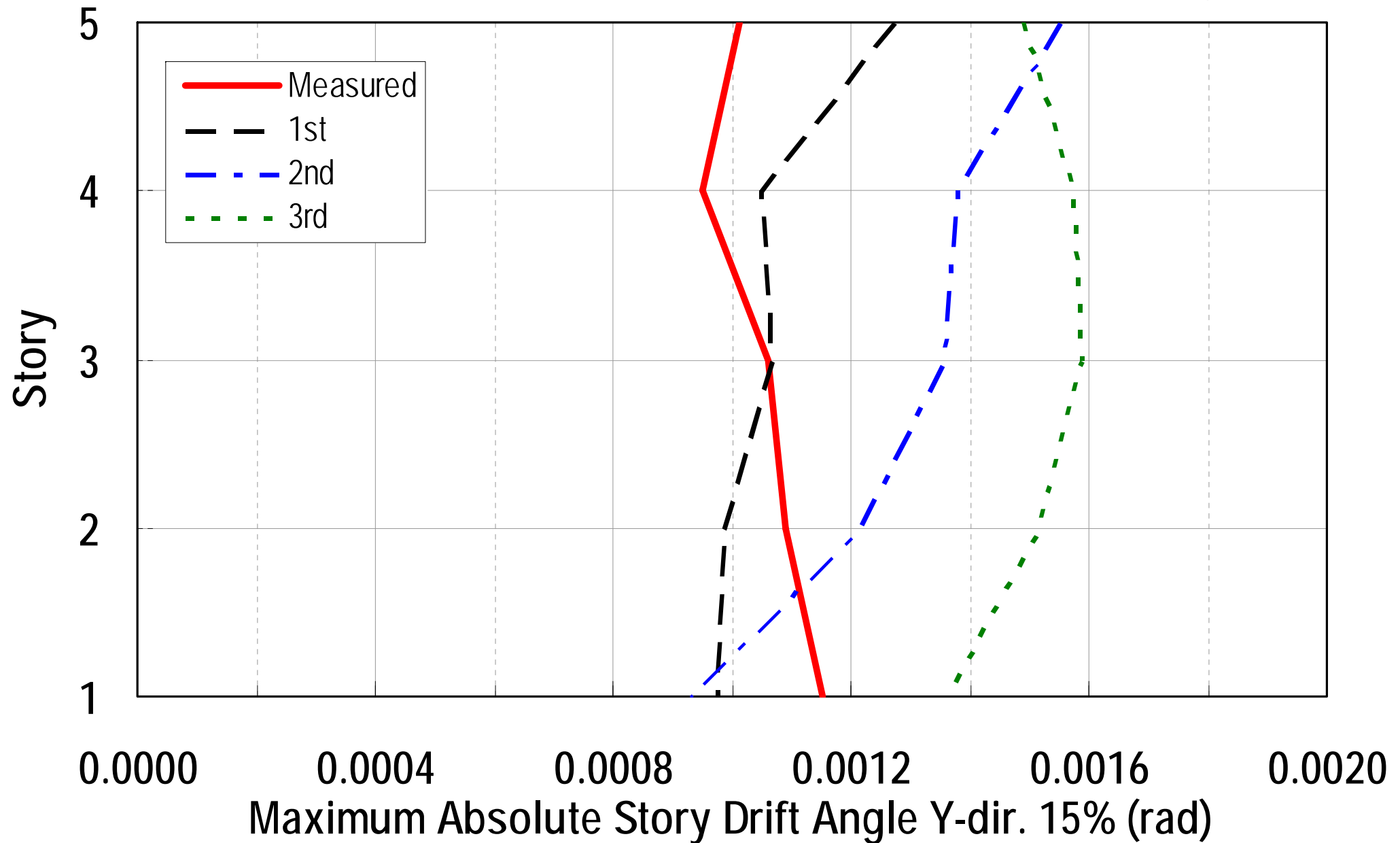
2D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



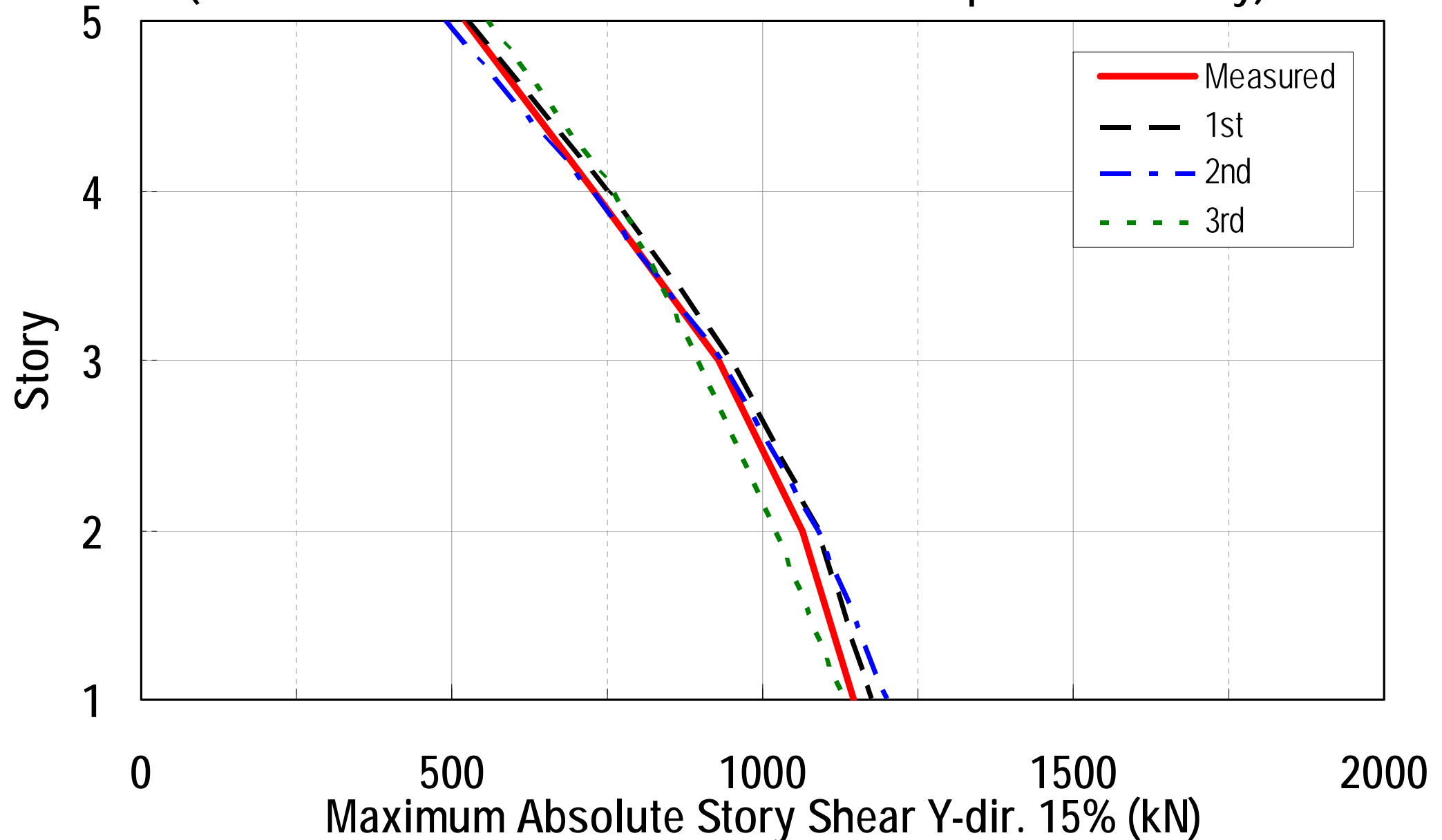
2D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



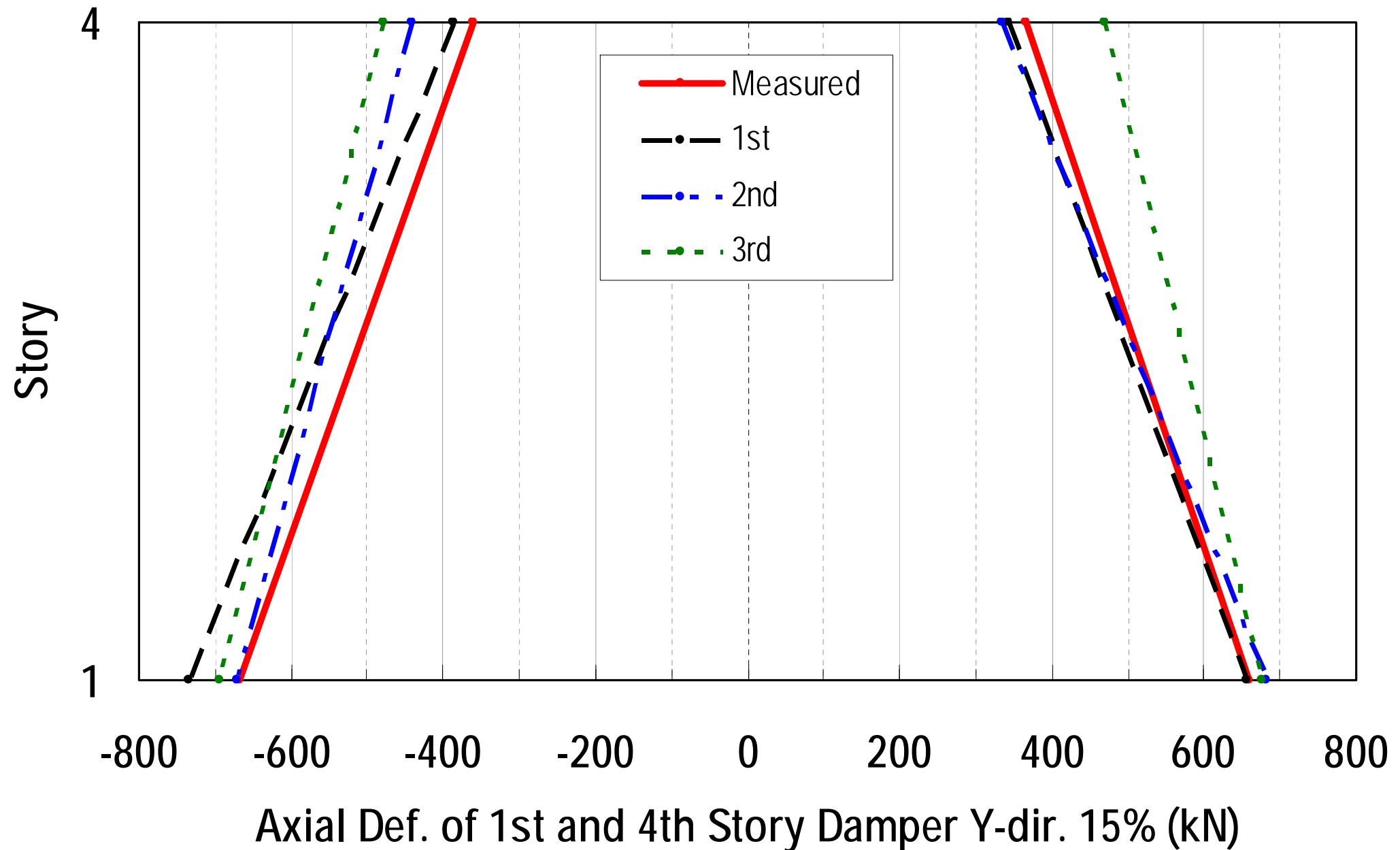
2D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



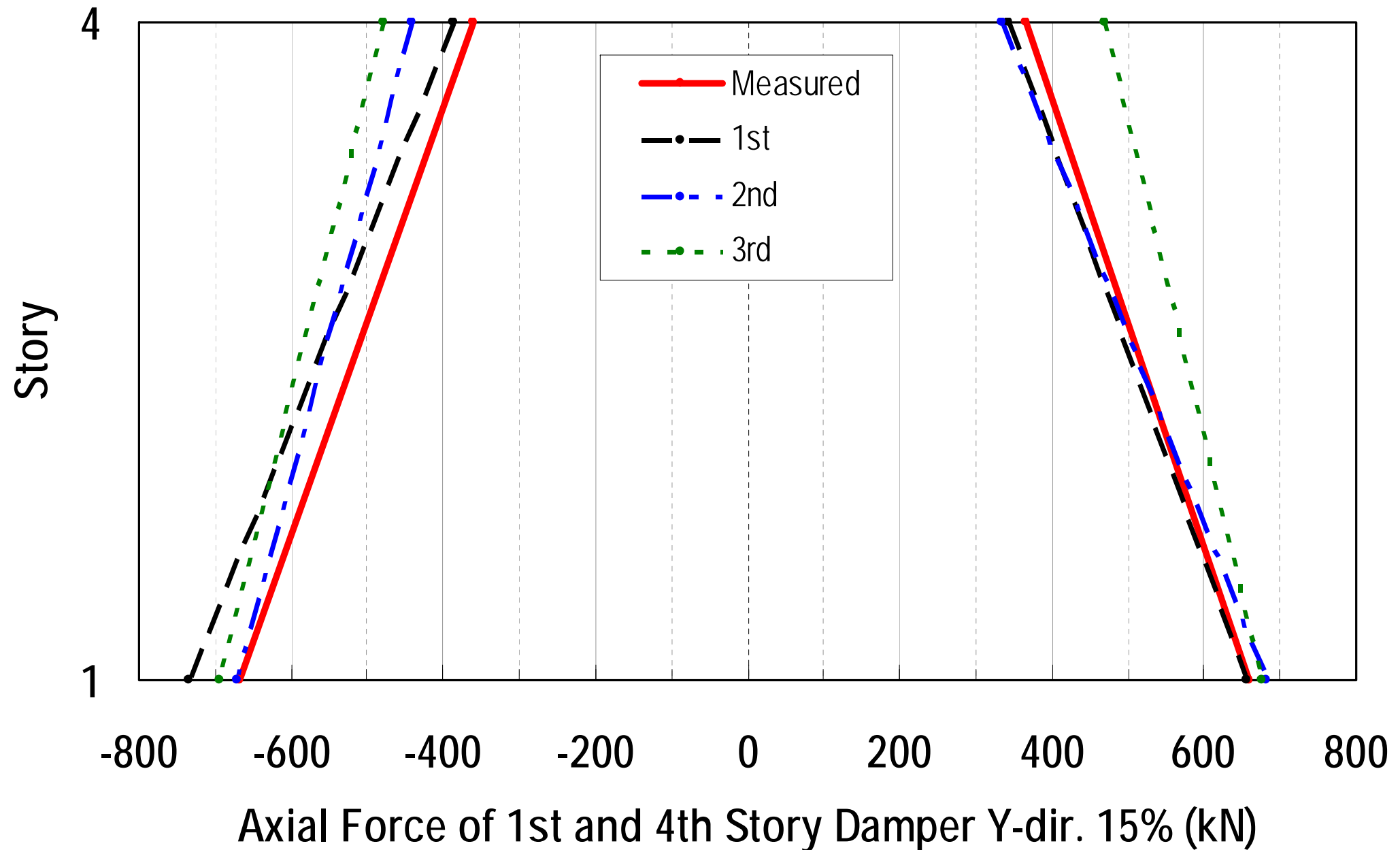
2D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



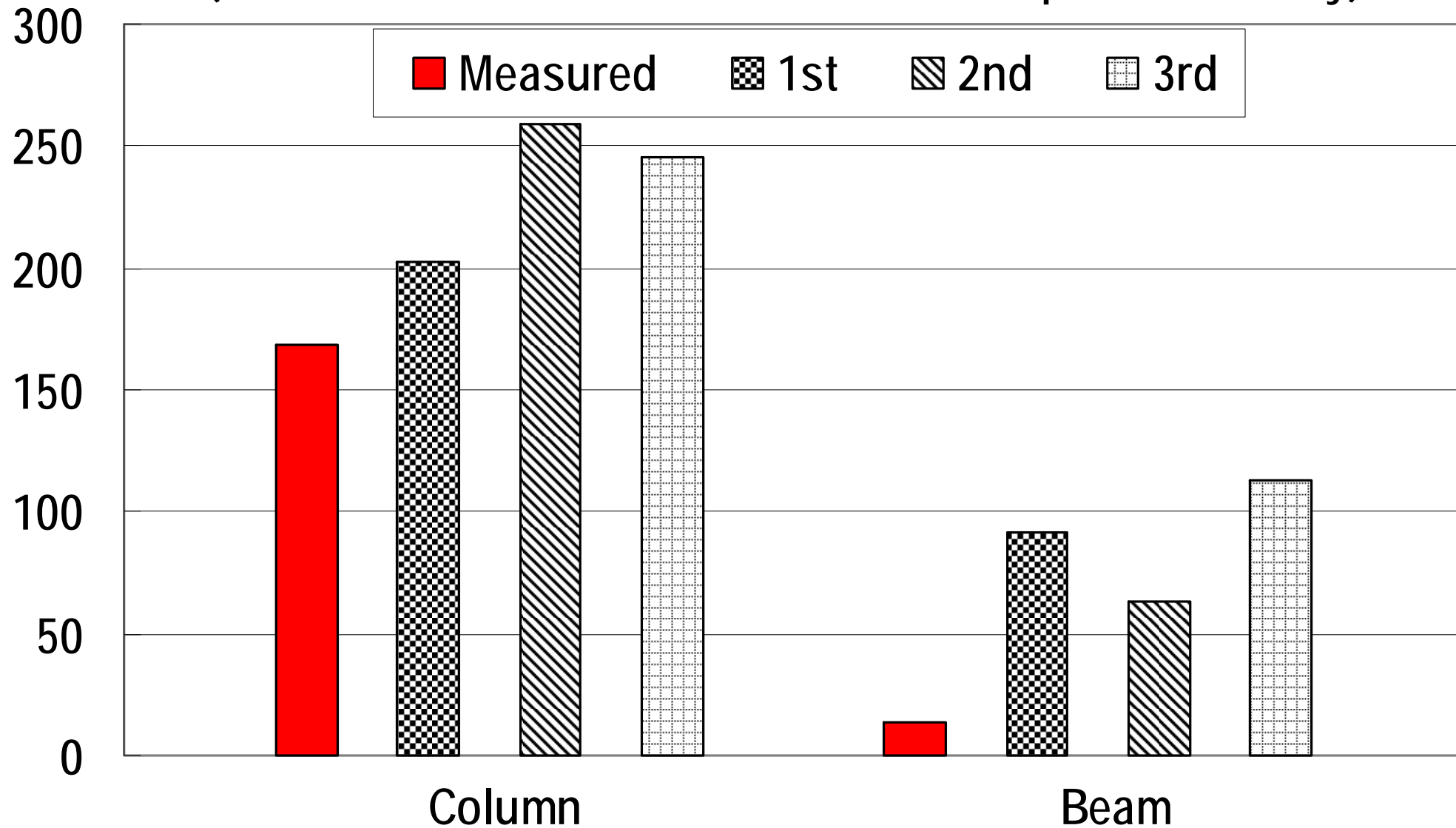
2D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



2D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)

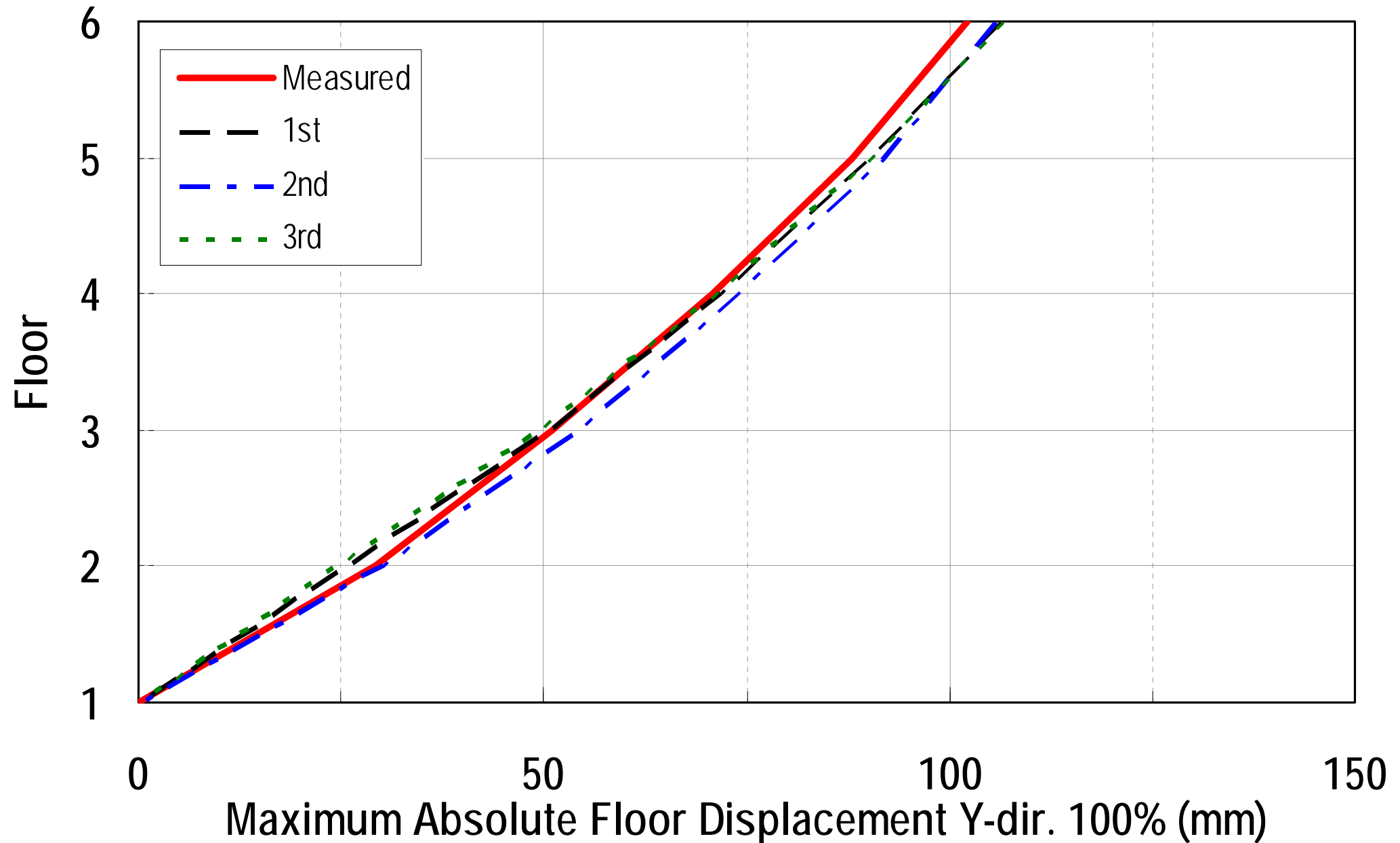


2D Steel Damper Blind Analysis Prediction Results (μ) (Measured and Best 3 Teams of Each Response Quantity)

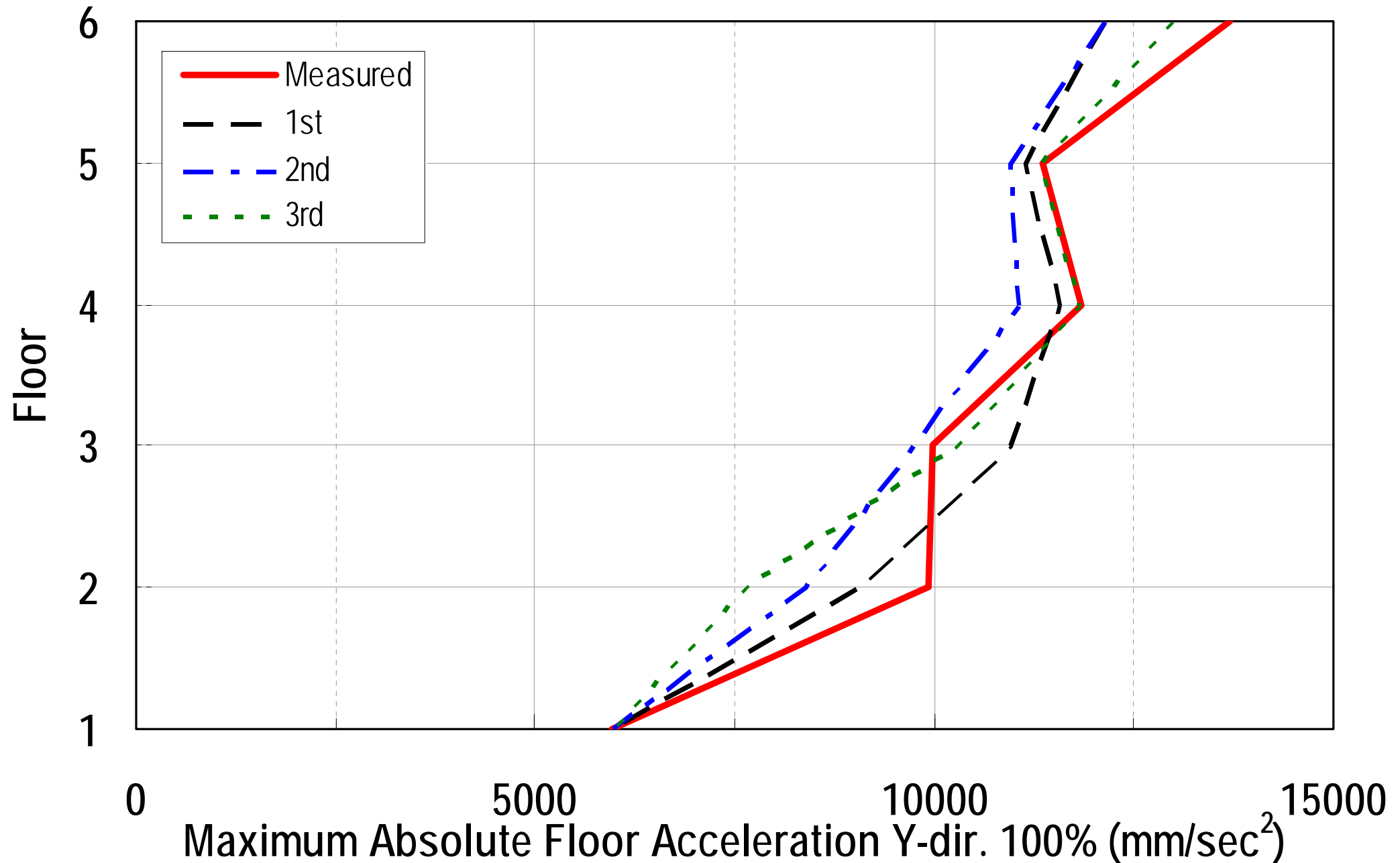


Axial Strain at the Designated Points of Colum and Beam 15%

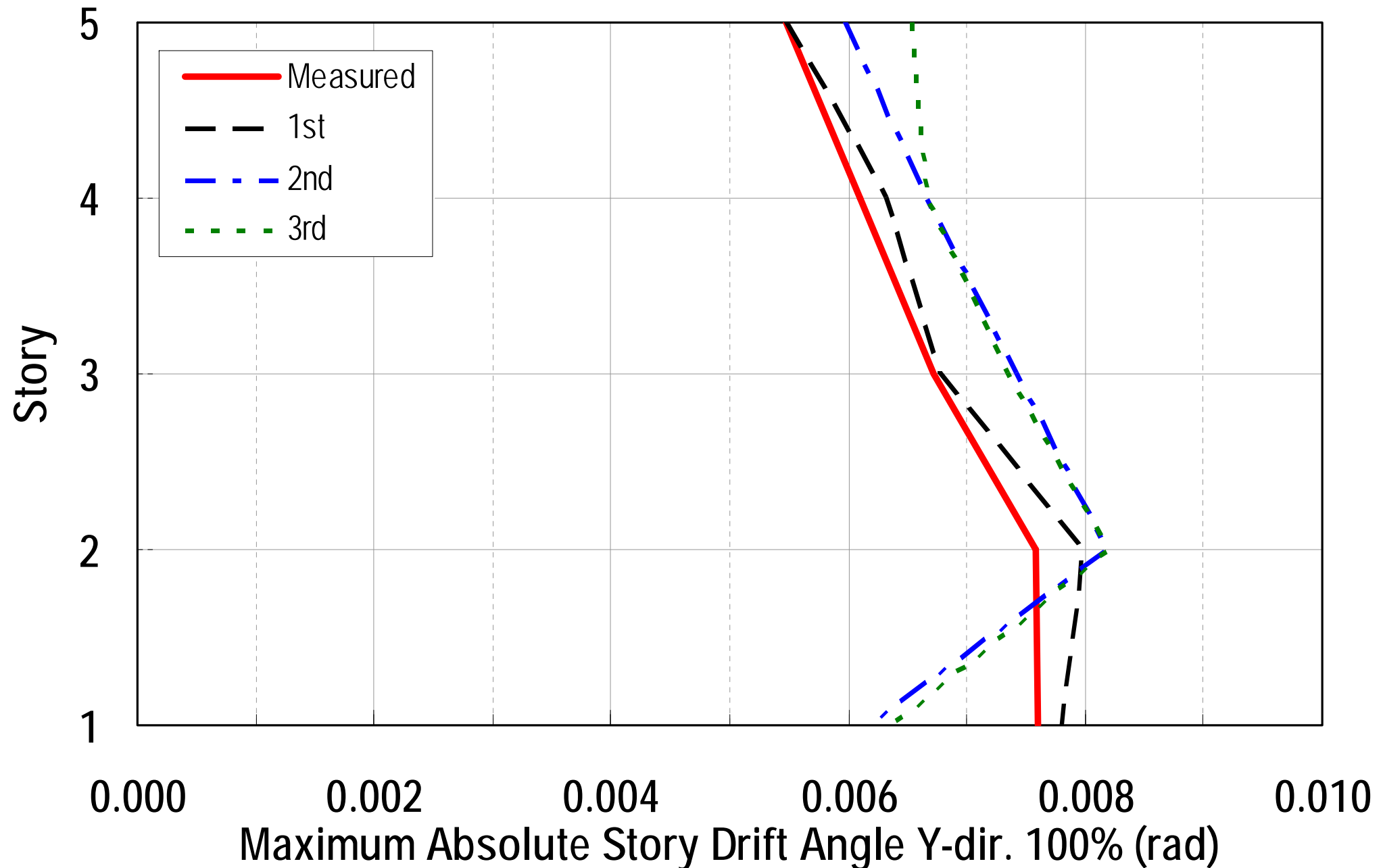
2D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



2D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)

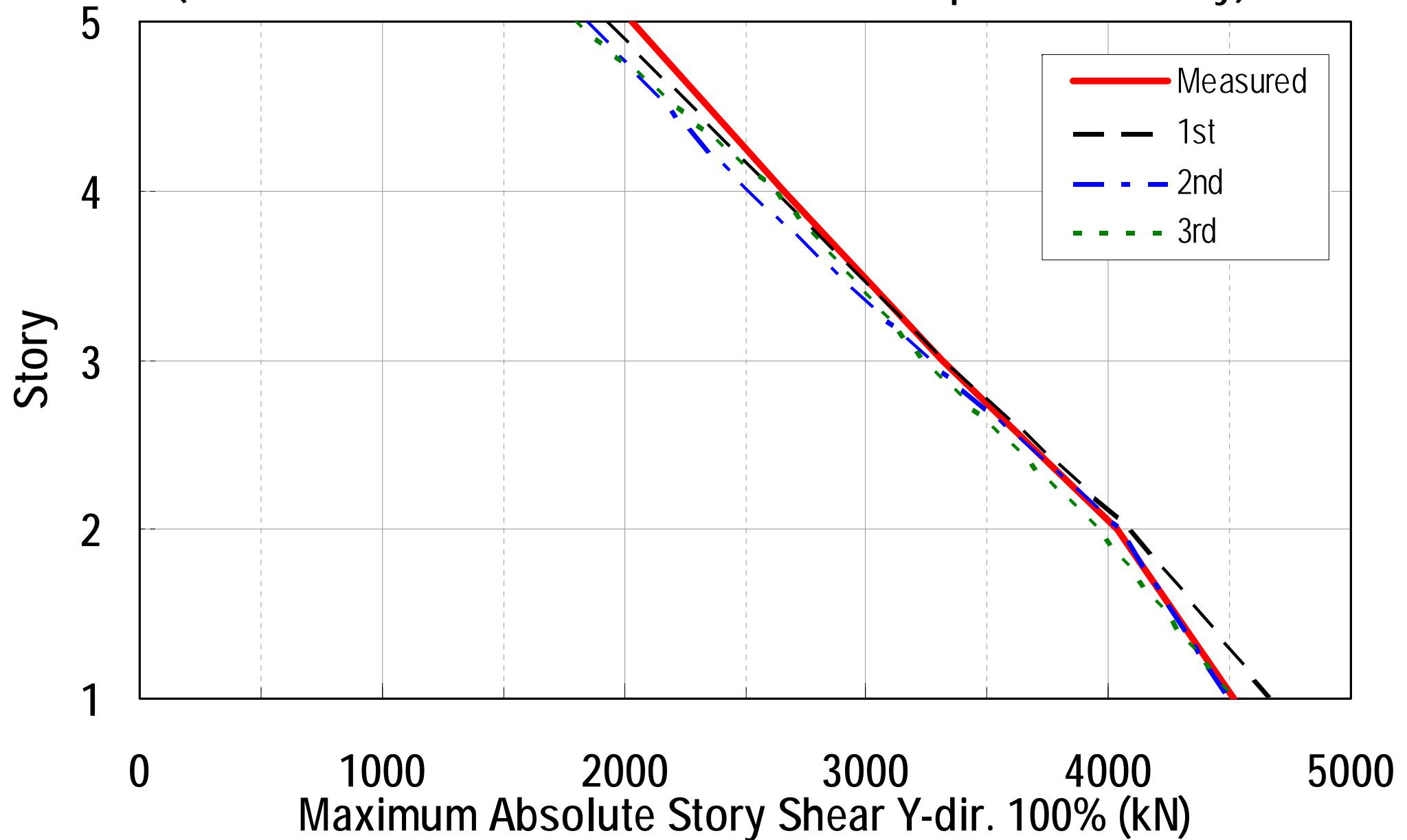


2D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)

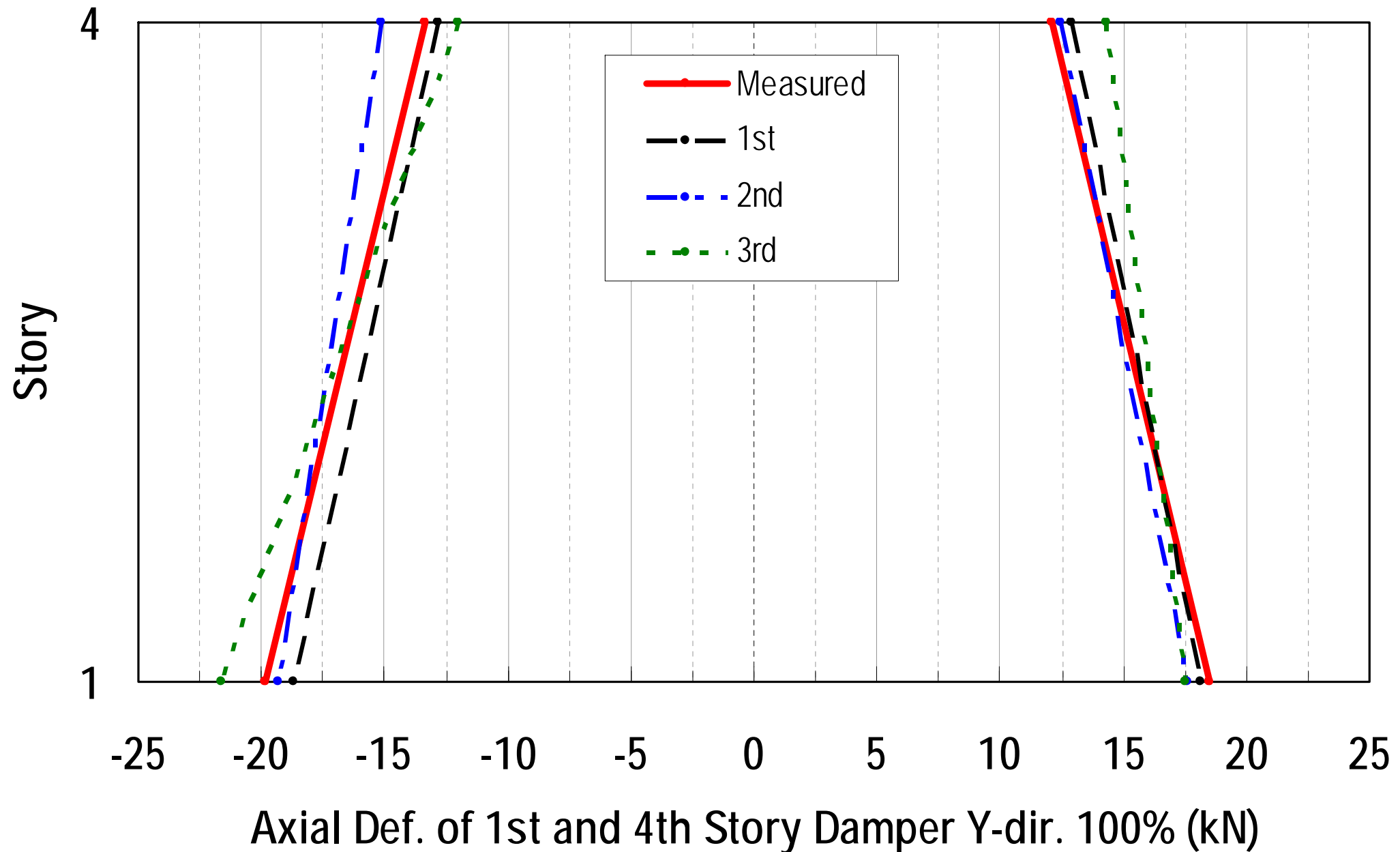




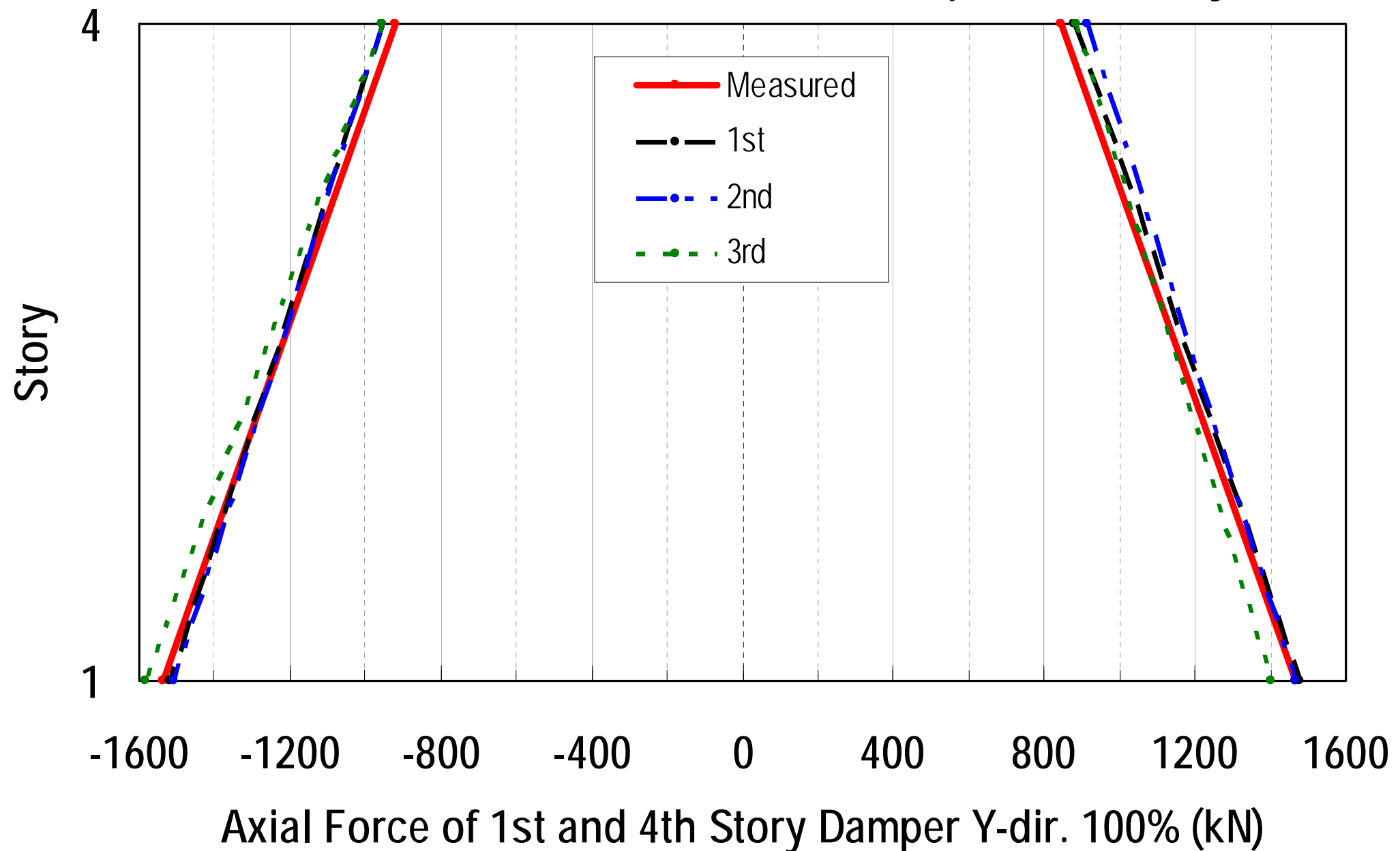
2D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



2D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)

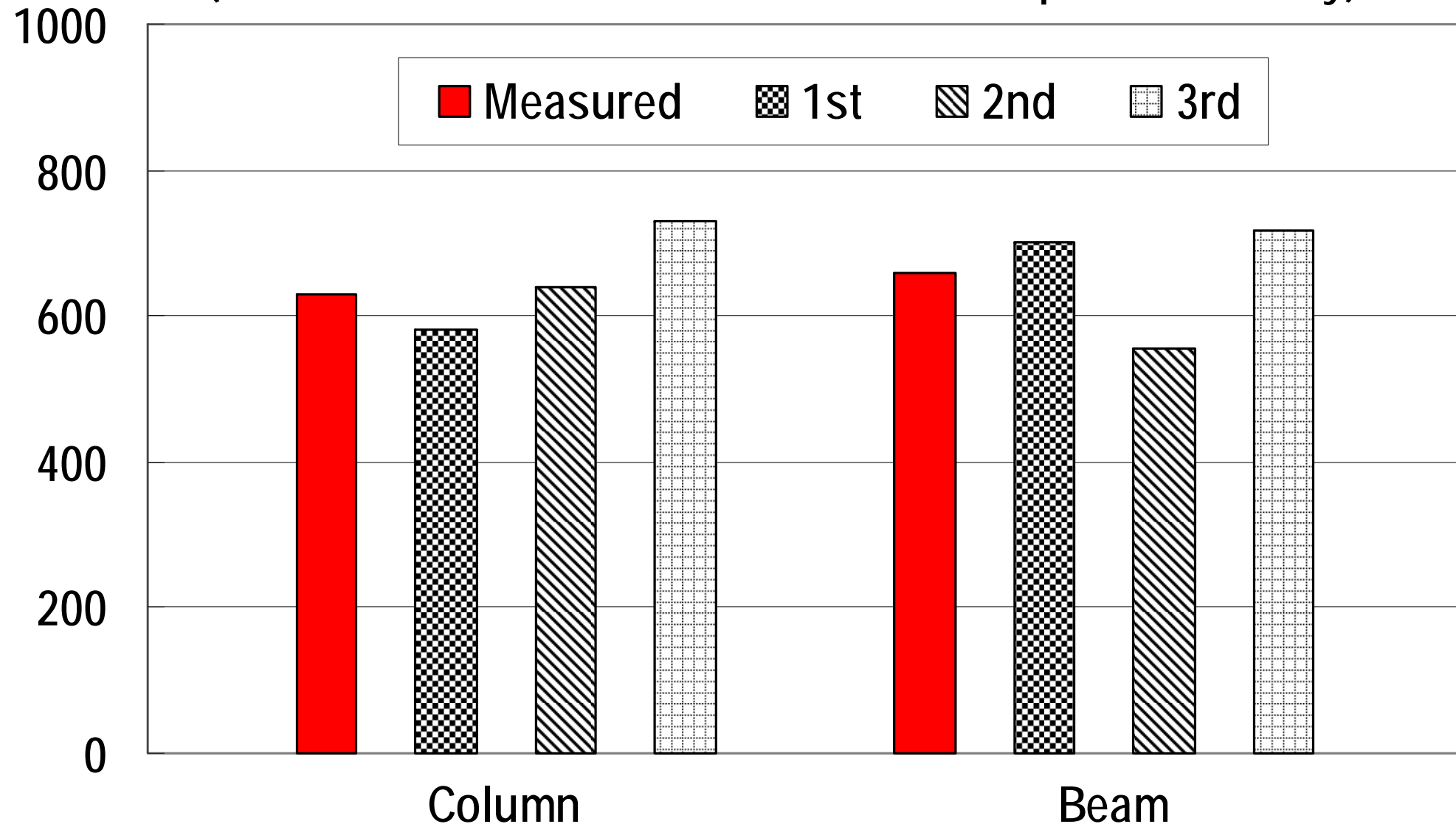


2D Steel Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



2D Steel Damper Blind Analysis Prediction Results

(μ) (Measured and Best 3 Teams of Each Response Quantity)

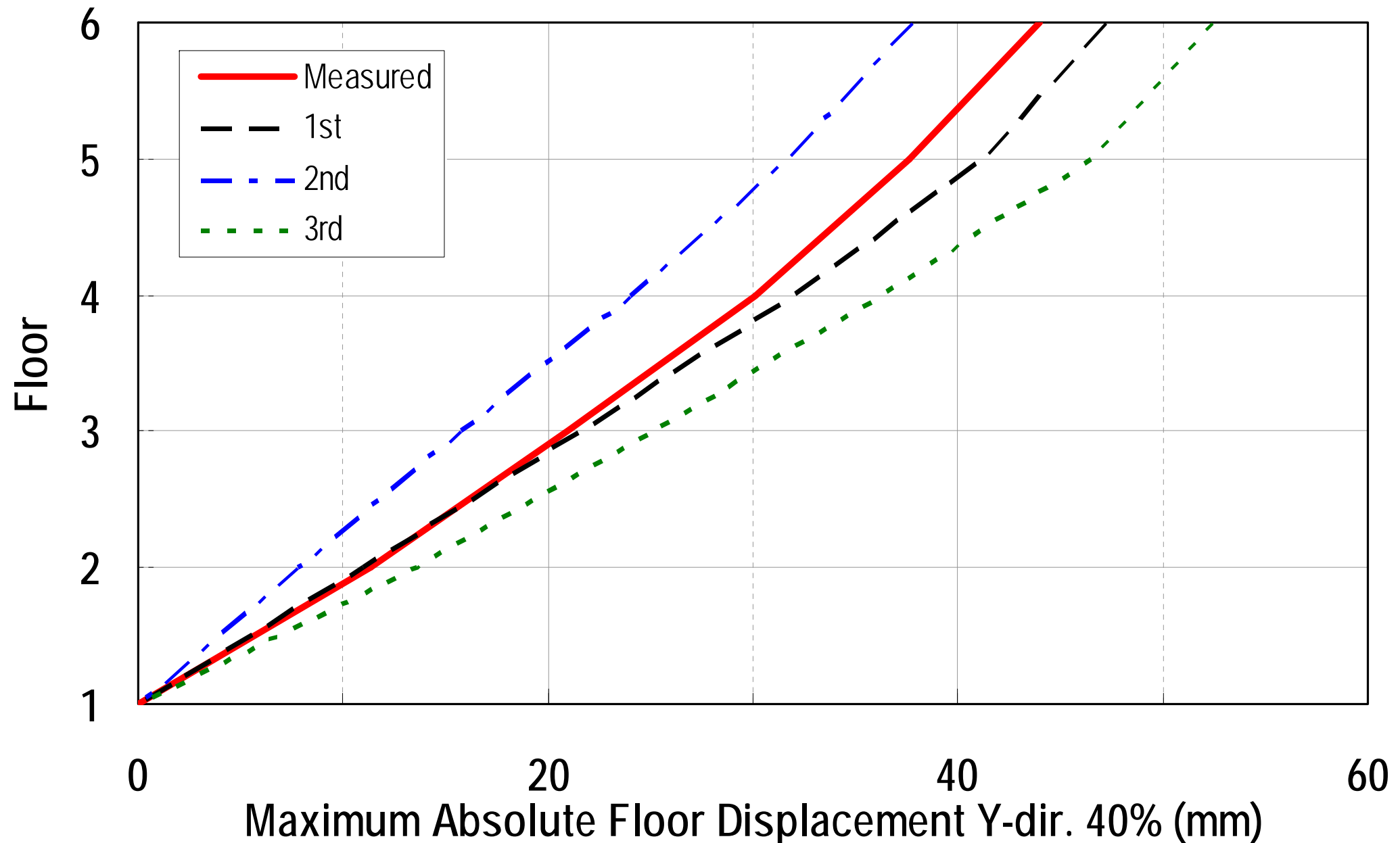


Axial Strain at the Designated Points of Colum and Beam 100%

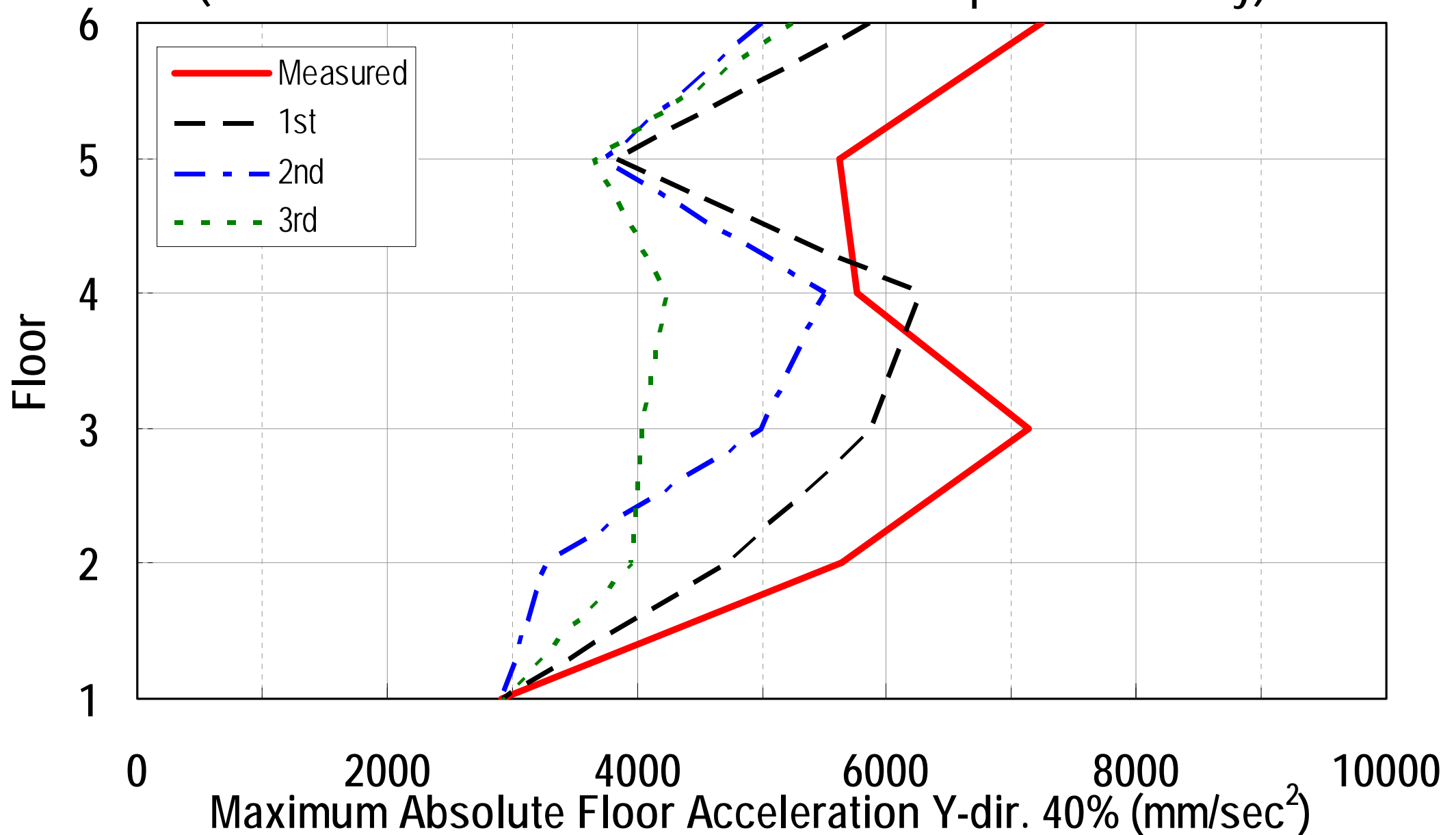


Category 4 : 2D Analysis Viscous Damper (Measured and Best 3 Teams of Each Response Quantity)

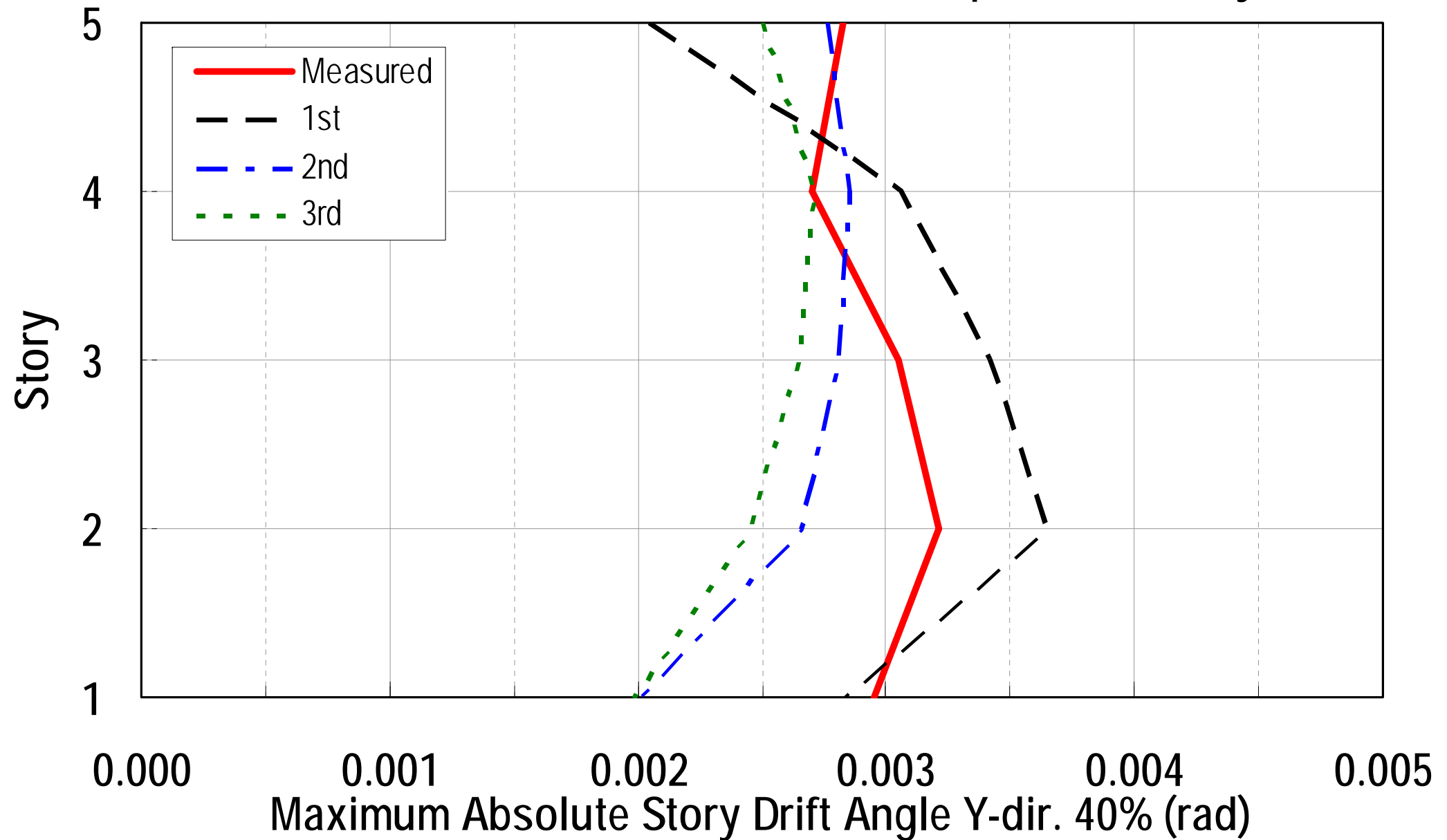
2D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



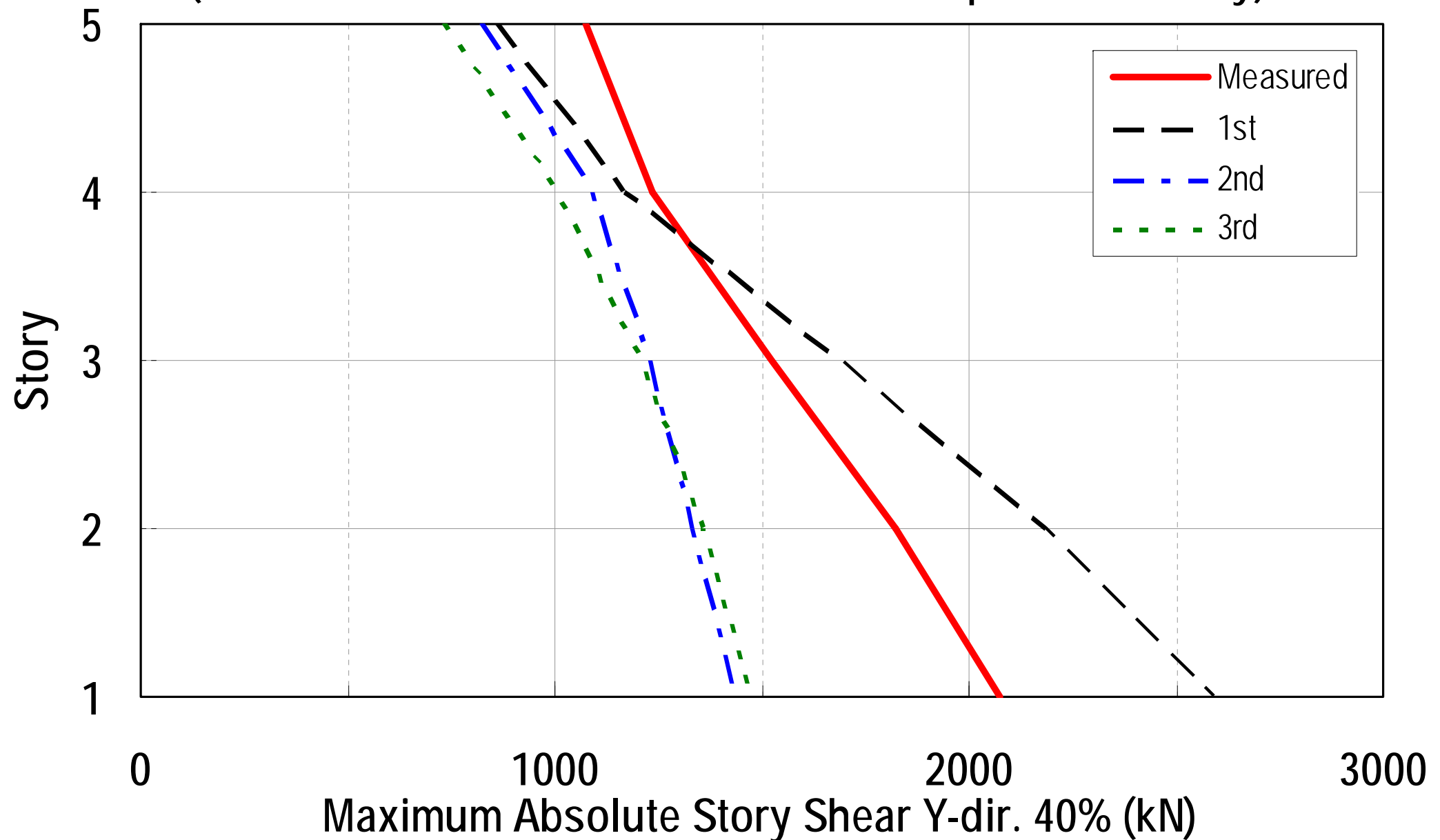
2D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



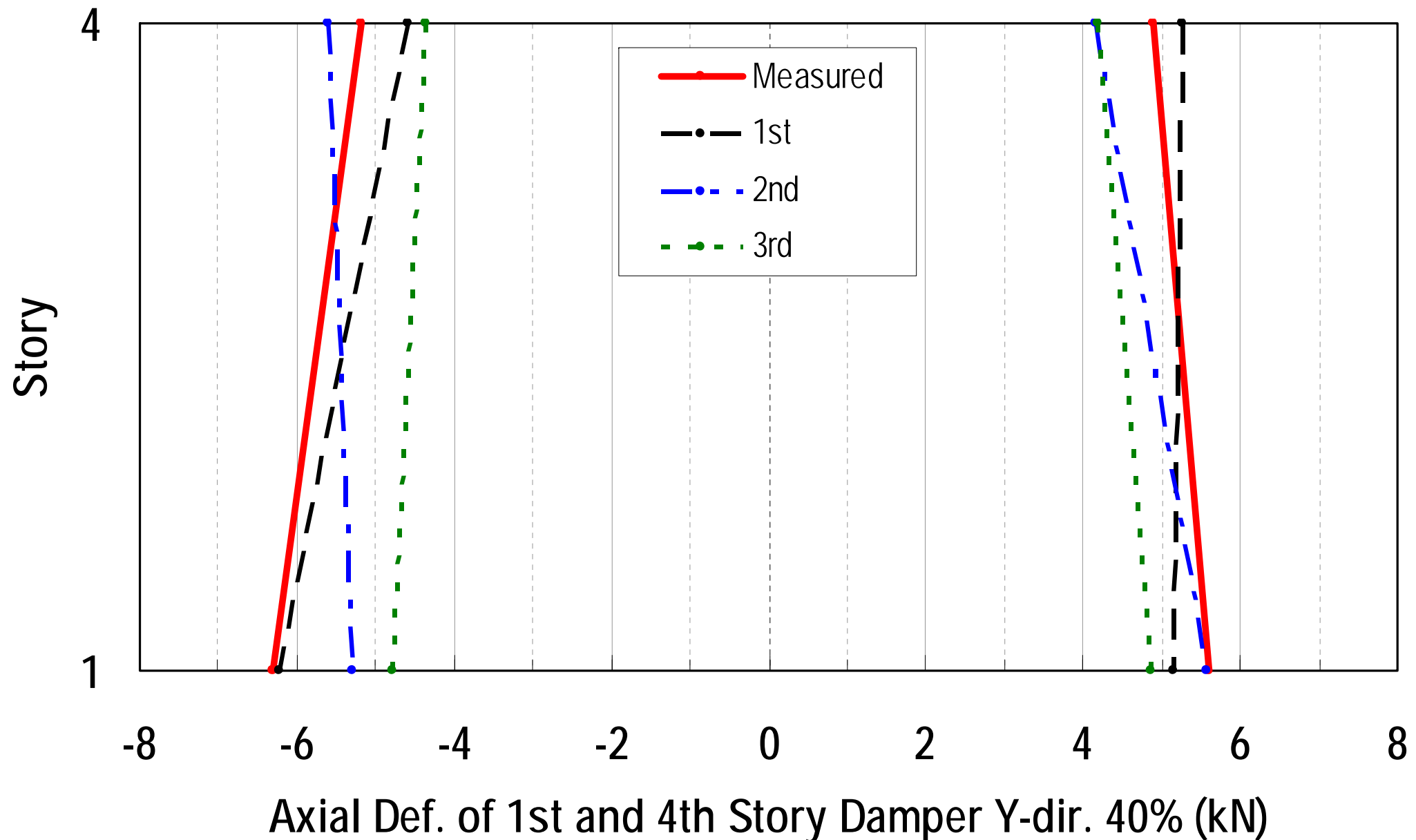
2D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



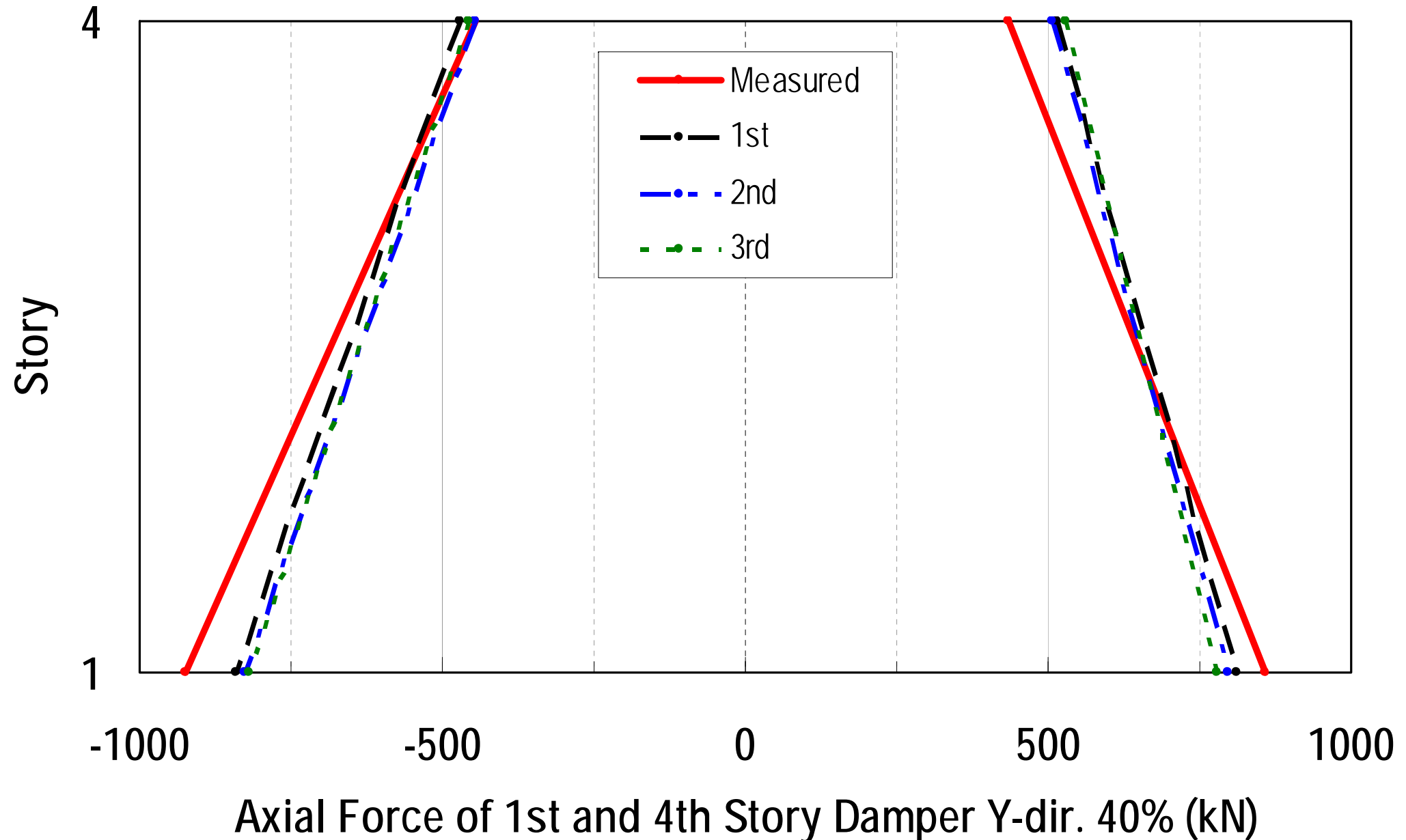
2D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



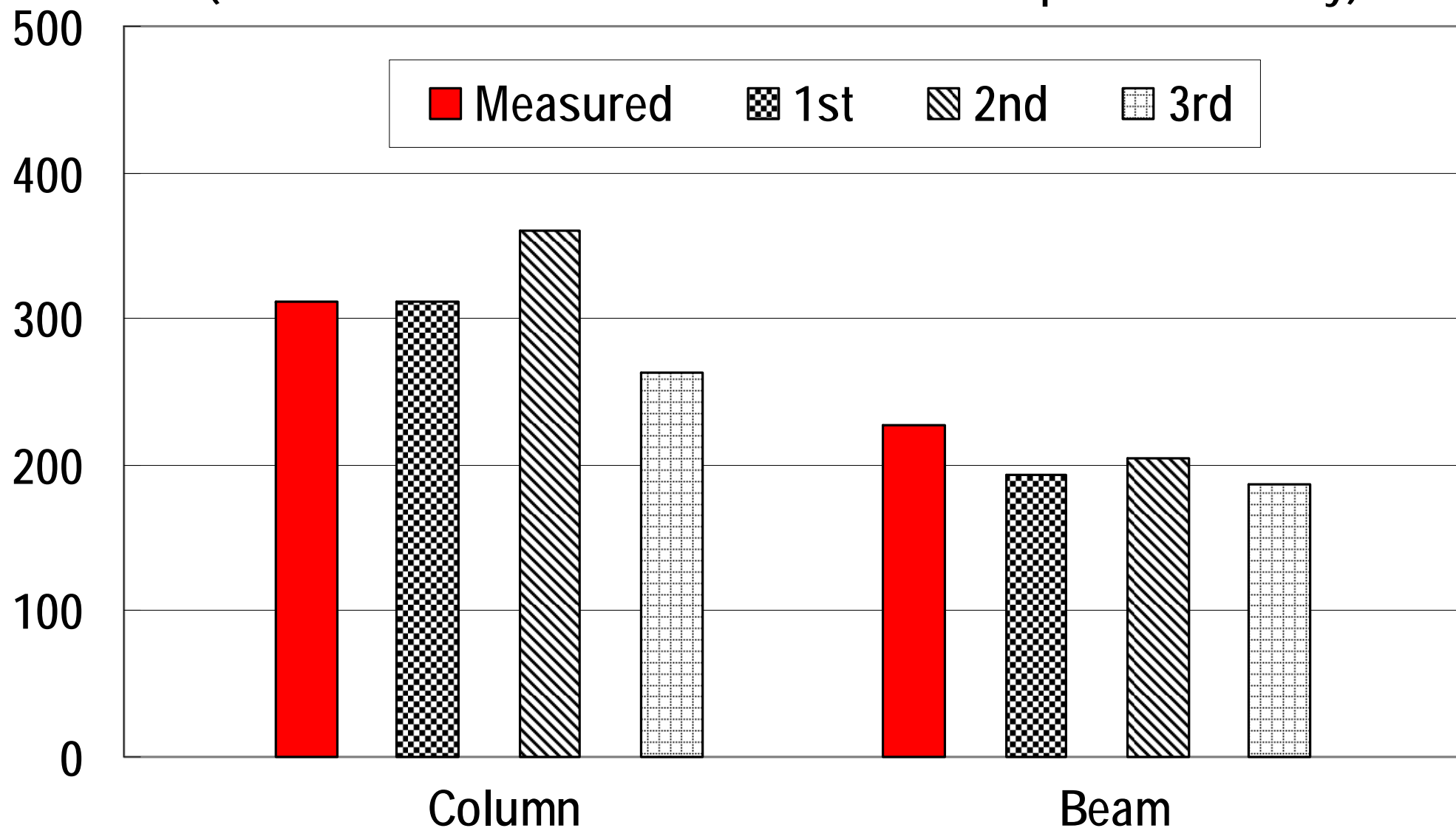
2D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



2D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)

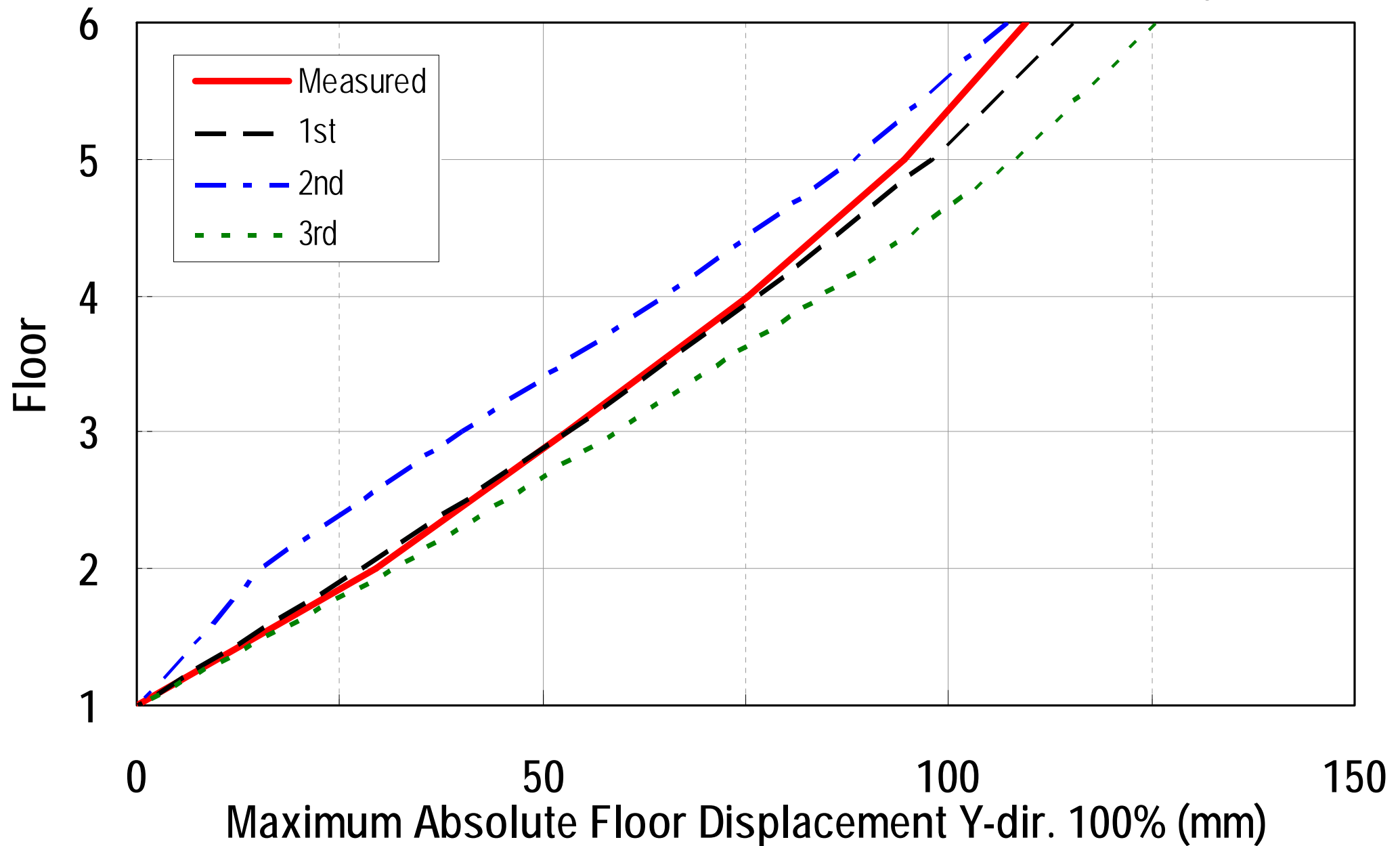


2D Viscous Damper Blind Analysis Prediction Results (μ) (Measured and Best 3 Teams of Each Response Quantity)

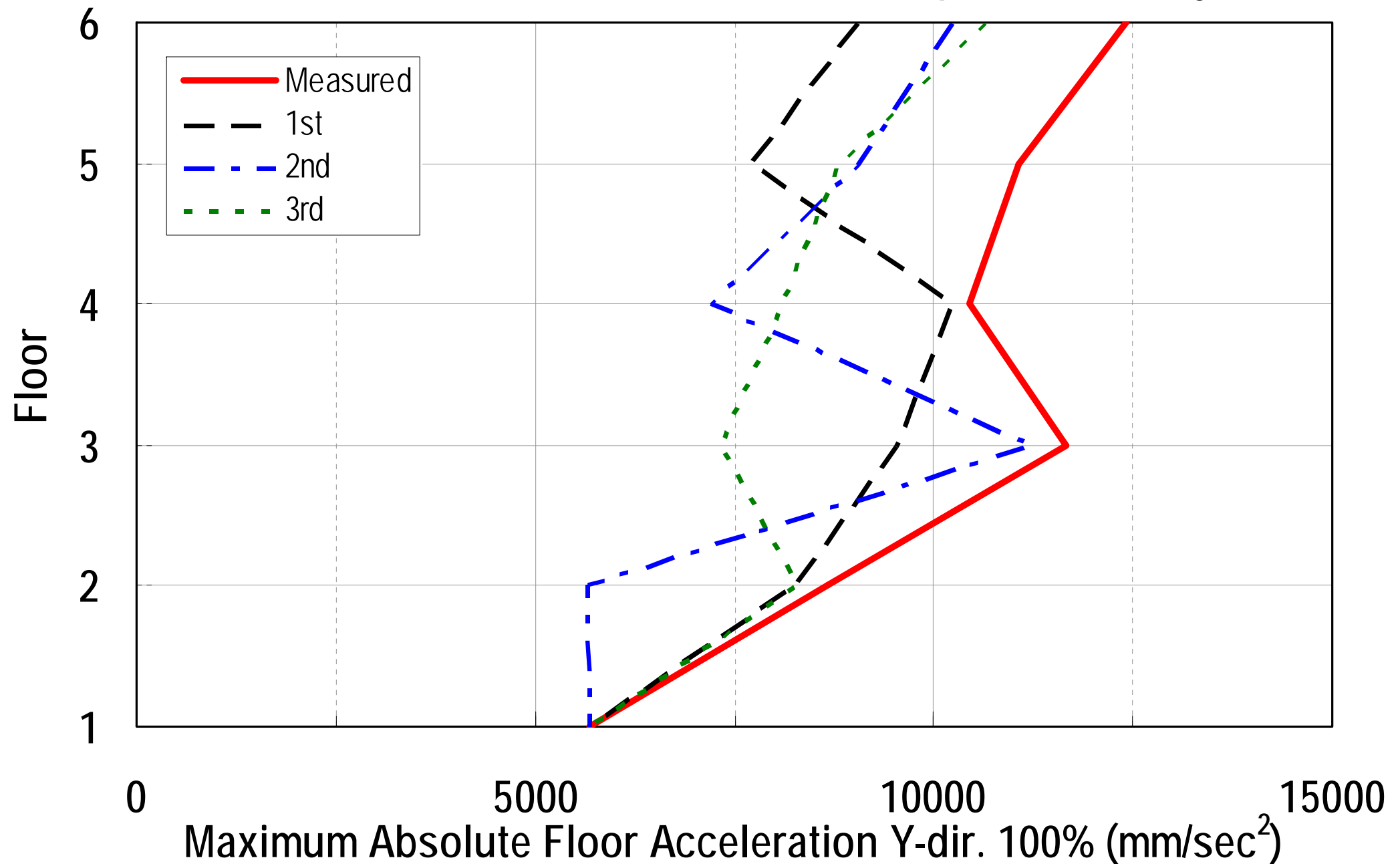


Axial Strain at the Designated Points of Colum and Beam 40%

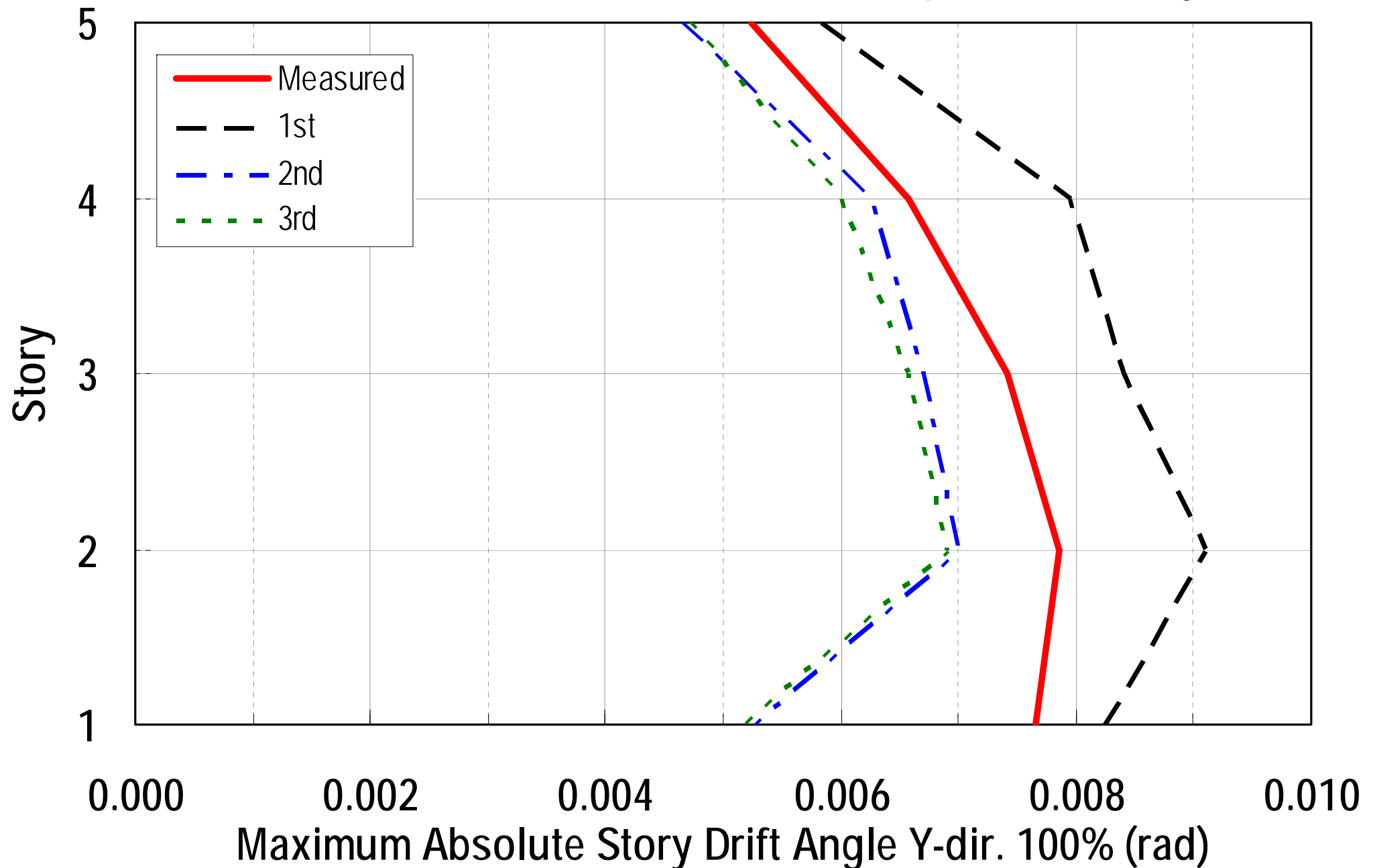
2D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



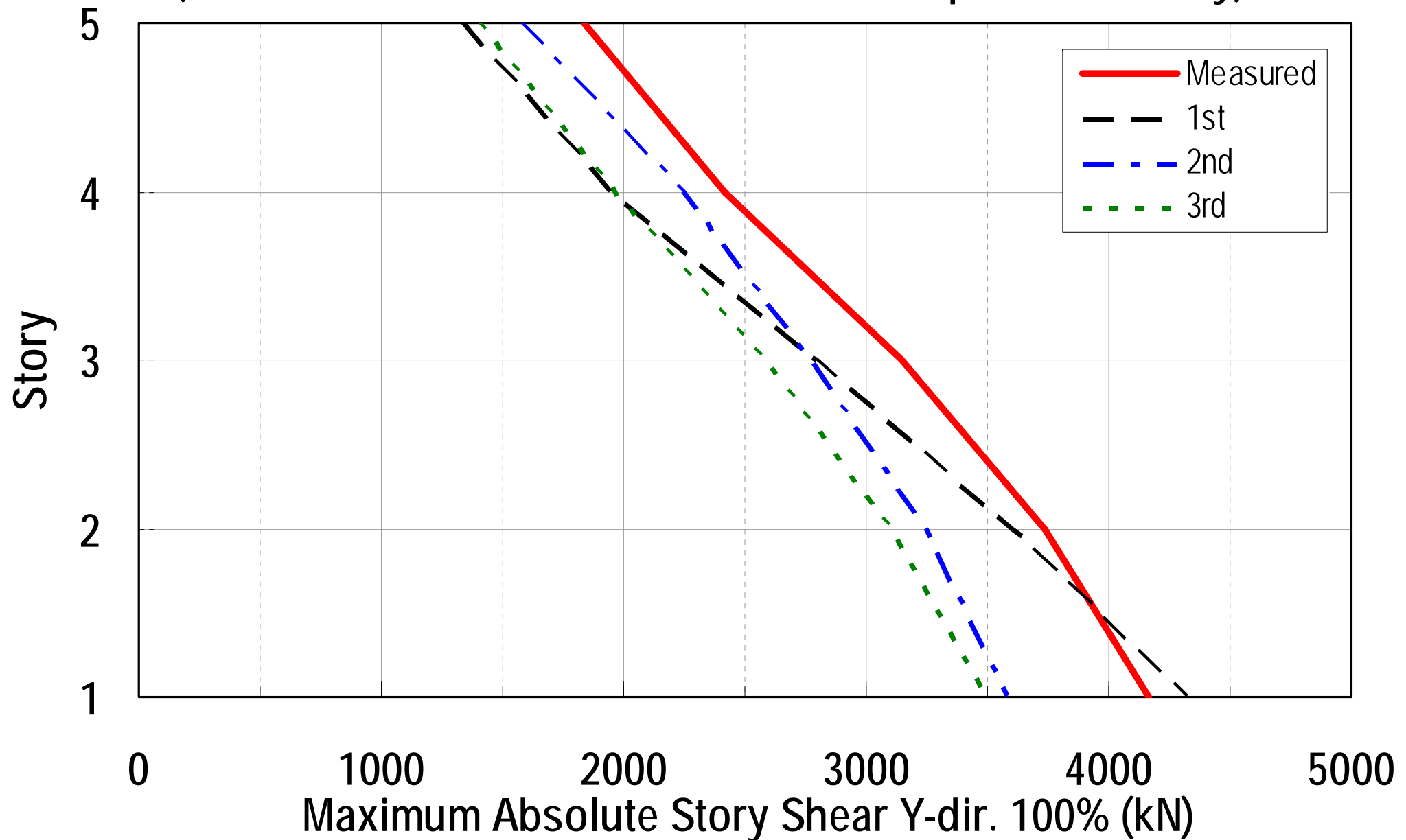
2D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



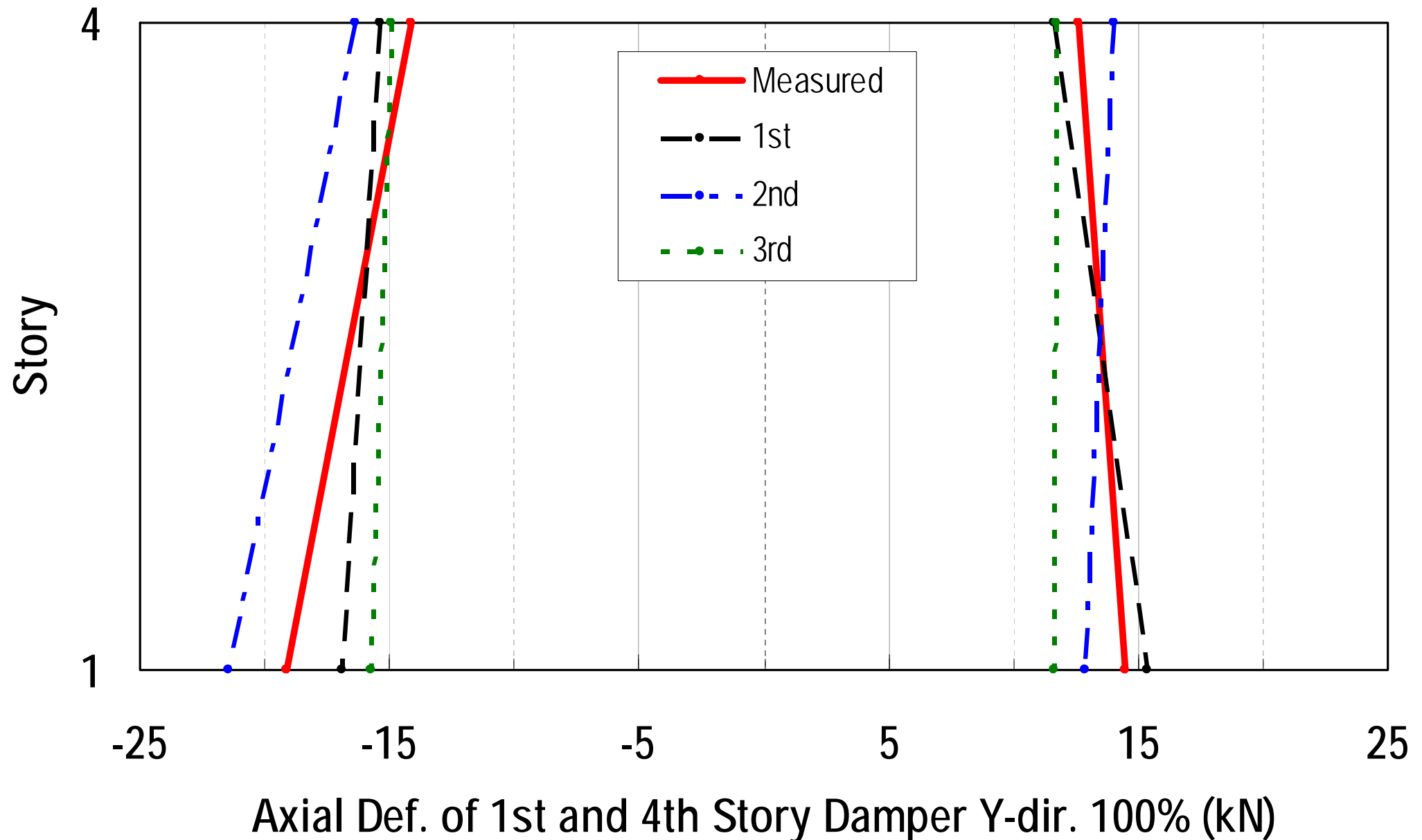
2D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



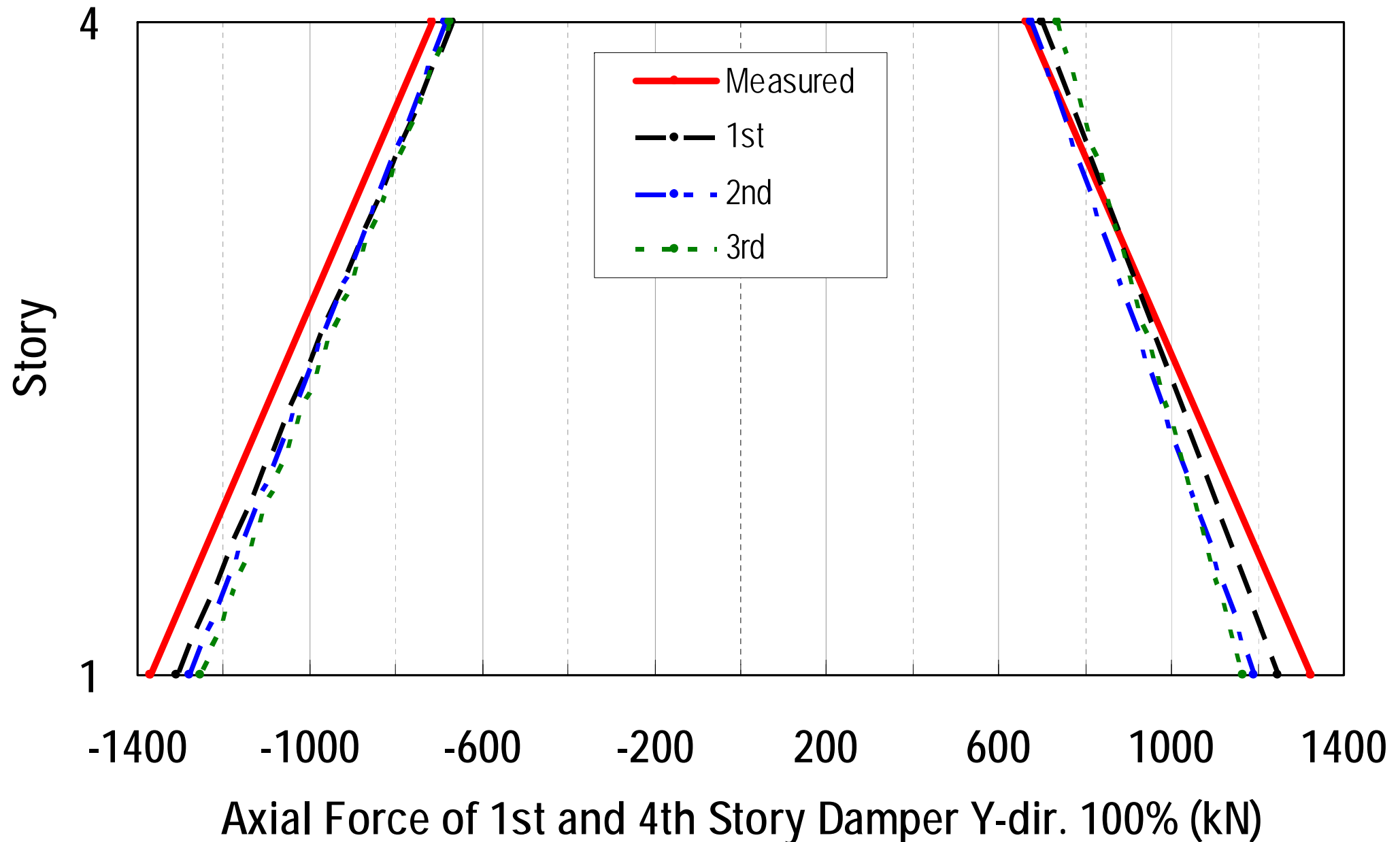
2D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



2D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)

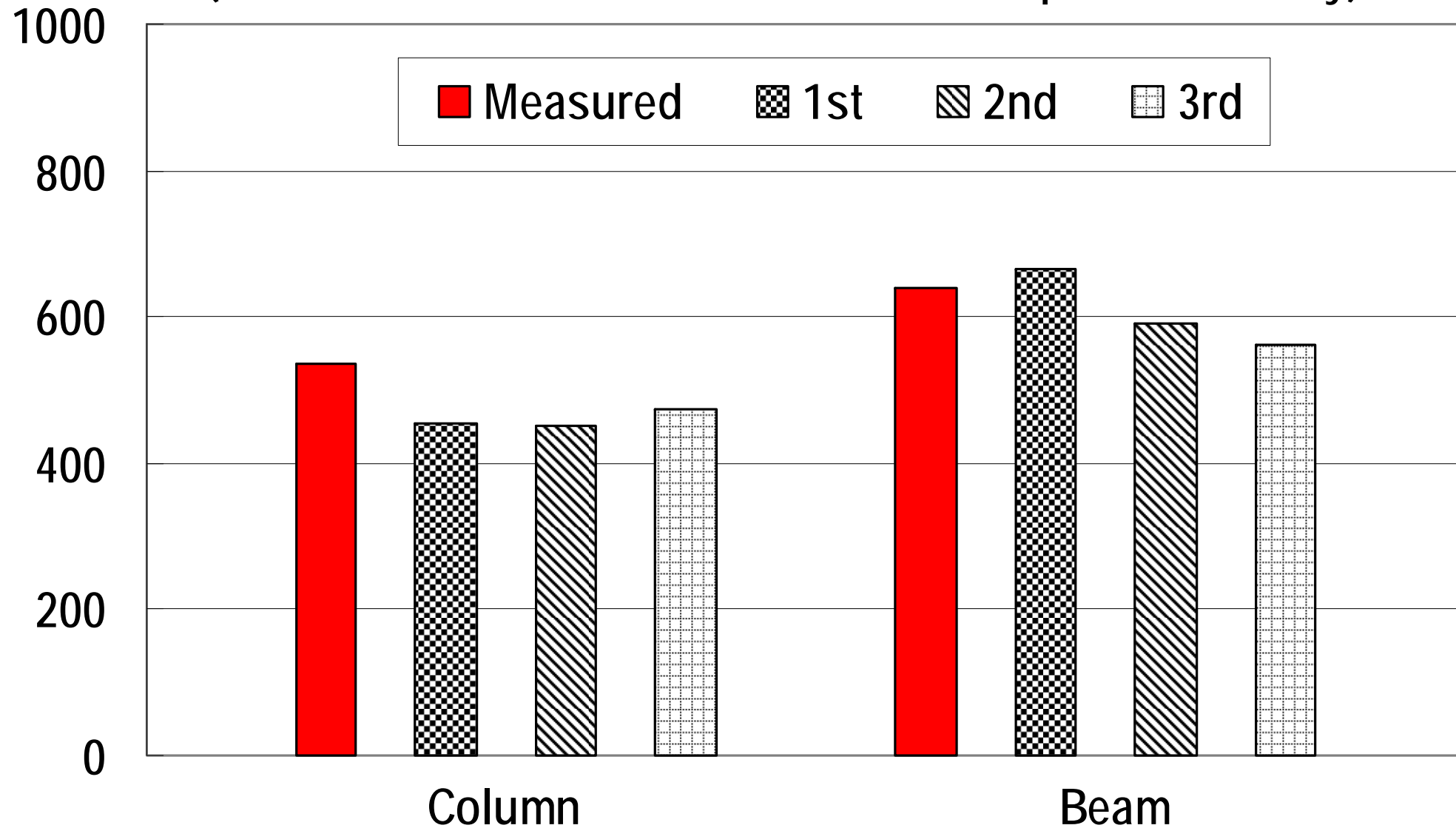


2D Viscous Damper Blind Analysis Prediction Results (Measured and Best 3 Teams of Each Response Quantity)



2D Viscous Damper Blind Analysis Prediction Results

(μ) (Measured and Best 3 Teams of Each Response Quantity)



Axial Strain at the Designated Points of Colum and Beam 100%



~ Winners ! ~

Winners will be invited to and will be awarded at the 7th CUEE and 5th ICEE Joint Conference, 2010, Tokyo, Japan.

Category1: 3D Analysis, Steel damper

Naohiro Nakamura, Takuya Suzuki, Soshi Nakamura, Masashi Yamamoto and another 2
Takenaka Corporation, Japan

Category2: 3D Analysis, Viscous damper

Tadamichi Yamashita, Jun Kawabata, Masayuki Ninomiya, Masaki Shibata and another 2
Kozo Keikaku Engineering Inc., Japan

Category3: 2D Analysis, Steel damper

Harumi Yoneda, Masashi Yamamoto, Takayuki Sone, Naohiro Nakamura and another 2
Takenaka Corporation, Japan

Category4: 2D Analysis, Viscous damper

Tadamichi Yamashita, Jun Kawabata, Masayuki Ninomiya, Norikazu Sakaba, and another 1
Kozo Keikaku Engineering Inc., Japan



Category1 (3D Analysis, Steel damper) Best 3 Teams

Winner (134 pt.)

Naohiro Nakamura, Takuya Suzuki, Soshi Nakamura,
Masashi Yamamoto, Takayuki Sone and Harumi Yoneda
Takenaka Corporation, Japan

2nd-place (107 pt.)

Yi-Jer Yu, Jui-Liang Lin, Pei-Ching Chen, Min-Lang Lin
National Center for Research on Earthquake Engineering, Taiwan

3rd-place (90 pt.)

Minoru Shugyo
Nagasaki University, Japan



Category2 (3D Analysis, Viscous damper) Best 3 Teams

Winner (131 pt.)

Tadamichi Yamashita, Jun Kawabata, Masayuki Ninomiya,
Masaki Shibata, Norikazu Sakaba, Yukimori Yanagawa
Kozo Keikaku Engineering Inc., Japan

2nd-place (96 pt.)

Naohiro Nakamura, Takuya Suzuki, Soshi Nakamura,
Masashi Yamamoto, Takayuki Sone and Harumi Yoneda
Takenaka Corporation, Japan

3rd-place (70 pt.)

Yi-Jer Yu, Jui-Liang Lin, Pei-Ching Chen, Min-Lang Lin
National Center for Research on Earthquake Engineering, Taiwan



Category3 (2D Analysis, Steel damper) Best 3 Teams

Winner (50 pt.)

Harumi Yoneda, Masashi Yamamoto, Takayuki Sone,
Naohiro Nakamura, Takuya Suzuki, Soshi Nakamura
Takenaka Corporation, Japan

2nd-place (43 pt.)

Bruce Maison
Structural Engineer, U.S.

3rd-place (42 pt.)

Yushu Liu, Gregory Deierlein, Xiang Ma, Dimitrios Lignos
Stanford University, U.S.

3rd-place (42 pt.)

Yi-Jer Yu, Jui-Liang Lin, Pei-Ching Chen, Min-Lang Lin
National Center for Research on Earthquake Engineering, Taiwan



Category4 (2D Analysis, Viscous damper) Best 3 Teams

Winner (90 pt.)

Tadamichi Yamashita, Jun Kawabata, Masayuki Ninomiya,
Norikazu Sakaba, Yukimori Yanagawa
Kozo Keikaku Engineering Inc., Japan

2nd-place (55 pt.)

Liling Cao, Ali Ashrafi, Elisabeth Malsch, Graeme Ballantyne
Thornton Tomasetti Inc., U.S.

3rd-place (38 pt.)

Harumi Yoneda, Masashi Yamamoto, Takayuki Sone,
Naohiro Nakamura, Takuya Suzuki, Soshi Nakamura
Takenaka Corporation, Japan