Scheduling Best Practices

The eighth article in the Scheduling Best Practices series is "How to Handle the Weather". Our colleague Beth Blair, a managing consultant in Warner's Disputes Resolution Group, has over 20 years of experience in all facets of the claims analysis process. Her experience typically includes the coding and preparation of complex as-built schedules, identification of pertinent issues, detailed issue analyses via document reviews, weather analyses, compilation of manpower studies, and performing change order analysis related to issues and impacts. Her responsibilities also include overall accounting analysis, impact cost workups, CPM schedule analysis, and document and database management. In addition, Ms. Blair has been involved in developing graphs, charts and schedules for use as trial exhibits and assisted in the preparation of narrative reports, as well as, assisting in preparations for deposition, arbitration and trial presentations.

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How to Handle the Weather

By Beth Blair, Managing Consultant Disputes Resolution Group

What is adverse weather and why does it matter? If no productive work can be completed because there was heavy rain or snow, don't we just claim a day of delay for the time lost? Why is weather significant? One or all of these questions may have crossed your mind at one time or another. This article will attempt to answer these questions and hopefully demonstrate how to plan for and properly submit a contract time extension for delays to the project caused by adverse weather.

To some, weather is an insignificant factor in the "big picture" of a project and not included in the initial planning and scheduling of the project. However, that mindset can be a significant error as adverse weather could cause a major disruption to even the best laid plans of any project.

ADVERSE WEATHER

What is adverse weather, also commonly referred to as unusually severe weather? It is any weather condition, rain, snow, temperature, etc., which exceeds historical data gathered over a specific period of time to establish what could be reasonably expected during the course of the project. For example, if the 10 year average for the number of days in the month of June for rainfall over .10 inches is five, and the

actual number of June rain days during your project is seven, you may be entitled to a two day time extension to the contract completion date.

Adverse Weather Defined in the Contract

To determine the criteria to follow for determining any adverse weather affect to your project, first read the Contract. What does the contract clause require to account for any adverse weather? Many contracts are very specific, others are vague or even non-existent. The example below is very specific as to how the Contractor is to account for adverse weather.

> *". . . anticipated adverse weather days shall be reflected in the Contractor's schedule and anticipated in all weather dependent activities. The anticipated adverse weather days are based upon a five (5) day work week and shall be reflected in the Contractor's calculation and claim for an extension of the Contract Time. The Contractor shall not be entitled to any delay days for any calendar week in which the Subcontractors are able to work forty (40) hours without overtime pay. In the event that the actual number of adverse weather days occurring during performance of the Work exceeds an aggregate of sixty-seven (67) regular work days for Sheeting, Shoring and Excavation Work and the Base Building Work combined, the Substantial Completion Dates shall then be extended . . . by the delay period resulting from the additional number of actual adverse weather days (beyond 67 days) that prevent Work from continuing. . . "*

This contract clause is a very rigid one and will require the Contractor to meticulously track any adverse weather. One element that does not appear in this contract clause is a provision that the work affected be on the critical path. In this instance, a specific Subcontractor's work could be pushed into an extended period of adverse weather by other project delays, resulting in that Subcontractor potentially being entitled to a time extension.

The following is another example of a weather related clause in a contract, this one is far less specific than the previous example and basically a "blanket" clause to cover a multitude of possibilities.

"FORCE MAJEURE . . . As used in this Agreement, the term "Force Majeure" shall mean any acts, events, or occurrences that are not caused by the negligence or misconduct of Contractor and are beyond the reasonable control of Contractor including without limitation, acts of God, earthquakes, drought, blight, famine, quarantine, blockade, governmental acts . . ., court orders or injunctions, war, insurrection or civil strife, strikes . . ., sabotage, explosions, provided however, that "Force Majeure" does not include the inability to pay monies due and owing."

The definition of force majeure is an unexpected or uncontrollable event. In this case, adverse weather is arguably an act of God. However, as you can see, there are no specifics on how to determine what period of time to use for the historical data, let alone how to submit a claim for a time extension.

This last example, extracted from U.S. Army Corps of Engineers specifications, is an example of a typical contract weather clause. It is straightforward and directs a Contractor to exactly what is expected from them.

"1. This provision specifies the procedure for determination of time extensions for unusually severe weather . . . In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

a. The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

b. The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the contractor.

2. The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities. . .

3. Upon acknowledgement of the Notice to Proceed (NTP) and continuing throughout the contract, the contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the contractor's scheduled work day. . . "

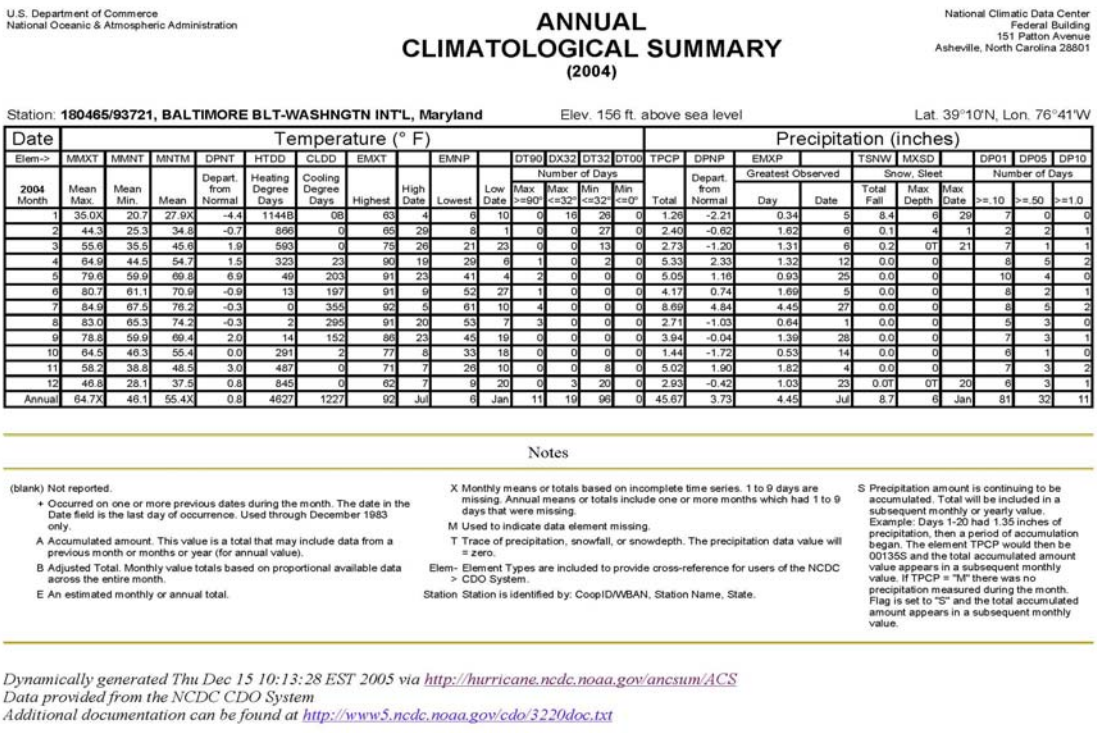
Since the terms of the Corps of Engineers specification are generally used in some form as the "standard", we will use them to discuss how to meet the requirements. No matter how your contract is written, using the following procedures will help you justify your time extension request in almost any situation.

Meeting the Contract Requirements for an Adverse Weather Claim

The first step is to determine the monthly anticipated adverse weather. How many days each month should you expect to incur adverse weather? By using data easily obtained from NOAA, who provides data for anywhere in the country, you can compile and analyze the raw data to form your estimate of anticipated delays.

Review the project technical specifications to determine what weather parameters will most likely affect this project based on the location and project scope. Will it be mainly affected by water (rain/snow), temperature, wind or a combination of factors? The parameters you determine apply to the project should create adverse conditions that will potentially delay construction activities. For example, concrete work is affected by temperature and any outside work is potentially affected by rain/snow. So, during the schedule timeframe for concrete, how many days in a given month can you expect temperatures to be below 32°?

Once you've determined what schedule sequences can potentially be affected by adverse weather, using the NOAA data, compile the number of days you can expect to be adverse for each month. The ideal would be to use consecutive data for a 10 year period, however, some contracts will stipulate another specific time period such as 5 or 20 years. If there is not a specific time period in the contract, use 10 years as the standard. Below is a sample of an Annual Climatological Summary prepared by NOAA. By gathering this data for the 10 years prior to your project, you can easily calculate the average number of days for a specific weather condition in each month.



U.S. Department of Commerce
National Oceanic & Atmospheric Administration

ANNUAL CLIMATOLOGICAL SUMMARY
(2004)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Station: **180465/93721, BALTIMORE BLT-WASHNGTN INT'L, Maryland** Elev. 156 ft. above sea level Lat. 39°10'N, Lon. 76°41'W

Date	Temperature (° F)															Precipitation (inches)									
Elem->	MMXT	MMNT	MNTM	DPNT	HTDD	CLDD	EMXT		EMNP		DT90	DX32	DT32	DT00		TPCP	DPNP	EMXP		TSNW	MXSD		DP01	DP05	DP10
											Number of Days							Greatest Observed		Snow, Sleet			Number of Days			
2004 Month	Mean Max.	Mean Min.	Mean	Depart. from Normal	Heating Degree Days	Cooling Degree Days	Highest	High Date	Lowest	Low Date	Max >=90°	Max <=32°	Min <=32°	Min <=0°		Total	Depart. from Normal	Day	Date	Total Fall	Max Depth	Max Date	>=.10	>=.50	>=1.0
1	35.0X	20.7	27.9X	-4.4	1144B	0B	63	4	6	10	0	16	26	0		1.26	-2.21	0.34	5	8.4	6	29	7	0	0
2	44.3	25.3	34.8	-0.7	866	0	65	29	8	1	0	0	27	0		2.40	-0.62	1.62	6	0.1	4	1	2	2	1
3	55.6	35.5	45.6	1.9	593	0	75	26	21	23	0	0	13	0		2.73	-1.20	1.31	6	0.2	0T	21	7	1	1
4	64.9	44.5	54.7	1.5	323	23	90	19	29	6	1	0	2	0		5.33	2.33	1.32	12	0.0	0		8	5	2
5	79.6	59.9	69.8	6.9	49	203	91	23	41	4	2	0	0	0		5.05	1.16	0.93	25	0.0	0		10	4	0
6	80.7	61.1	70.9	-0.9	13	197	91	9	52	27	1	0	0	0		4.17	0.74	1.69	5	0.0	0		8	2	1
7	84.9	67.5	76.2	-0.3	0	355	92	5	61	10	4	0	0	0		8.69	4.84	4.45	27	0.0	0		8	5	2
8	83.0	65.3	74.2	-0.3	2	295	91	20	53	7	3	0	0	0		2.71	-1.03	0.64	1	0.0	0		5	3	0
9	78.8	59.9	69.4	2.0	14	152	86	23	45	19	0	0	0	0		3.94	-0.04	1.39	28	0.0	0		7	3	1
10	64.5	46.3	55.4	0.0	291	2	77	8	33	18	0	0	0	0		1.44	-1.72	0.53	14	0.0	0		6	1	0
11	58.2	38.8	48.5	3.0	487	0	71	7	26	10	0	0	8	0		5.02	1.90	1.82	4	0.0	0		7	3	2
12	46.8	28.1	37.5	0.8	845	0	62	7	9	20	0	3	20	0		2.93	-0.42	1.03	23	0.0T	0T	20	6	3	1
Annual	64.7X	46.1	55.4X	0.8	4627	1227	92	Jul	6	Jan	11	19	96	0		45.67	3.73	4.45	Jul	8.7	6	Jan	81	32	11

Notes

(blank) Not reported.
\+ Occurred on one or more previous dates during the month. The date in the Date field is the last day of occurrence. Used through December 1983 only.
A Accumulated amount. This value is a total that may include data from a previous month or months or year (for annual value).
B Adjusted Total. Monthly value totals based on proportional available data across the entire month.
E An estimated monthly or annual total.
X Monthly means or totals based on incomplete time series. 1 to 9 days are missing. Annual means or totals include one or more months which had 1 to 9 days that were missing.
M Used to indicate data element missing.
T Trace of precipitation, snowfall, or snowdepth. The precipitation data value will = zero.
Elem- Element Types are included to provide cross-reference for users of the NCDC > CDO System.
Station Station is identified by: CoopID/WBAN, Station Name, State.
S Precipitation amount is continuing to be accumulated. Total will be included in a subsequent monthly or yearly value. Example: Days 1-20 had 1.35 inches of precipitation, then a period of accumulation began. The element TPCP would then be 00135S and the total accumulated amount value appears in a subsequent monthly value. If TPCP = "M" there was no precipitation measured during the month. Flag is set to "S" and the total accumulated amount appears in a subsequent monthly value.

Dynamically generated Thu Dec 15 10:13:28 EST 2005 via http://hurricane.ncdc.noaa.gov/ancsum/ACS
Data provided from the NCDC CDO System
Additional documentation can be found at http://www5.ncdc.noaa.gov/cdo/3220doc.txt

Now you have determined, for each sequence of work for the project, how many days each month you can expect the project to be affected by adverse weather. What do you do with the data? Compare your preliminary project schedule and the adverse weather data you compiled. You will need to analyze concurrent effects of a weather event on different sequences of work, any project specific conditions and the estimated impact a weather event will have, i.e. will there be a continued delay after the adverse weather occurrence. Once you have completed this analysis, the applicable values need to be applied to the project schedule. By producing this schedule, you will get a true picture of the expected performance time for the project.

Once the project begins, weather information should be recorded daily on the jobsite daily reports. Any adverse weather, including temperature, wind, rain, etc., should be noted. In addition, notes should be included If the weather event is adversely affecting a specific trade or sequence of work. A discussion of adverse weather affects should also be included in the monthly progress report so all parties to the construction process will be aware of any delays the weather has caused.

Also, be aware that many contracts require written notice of a delay caused by adverse weather within a specific time period after the delay occurs. So, if your contract requires written notice of the delay within 10 days of the occurrence, write the letter. Even though a time extension may not be granted for weather delays until the project nears Substantial Completion, the contract requirement will be fulfilled.

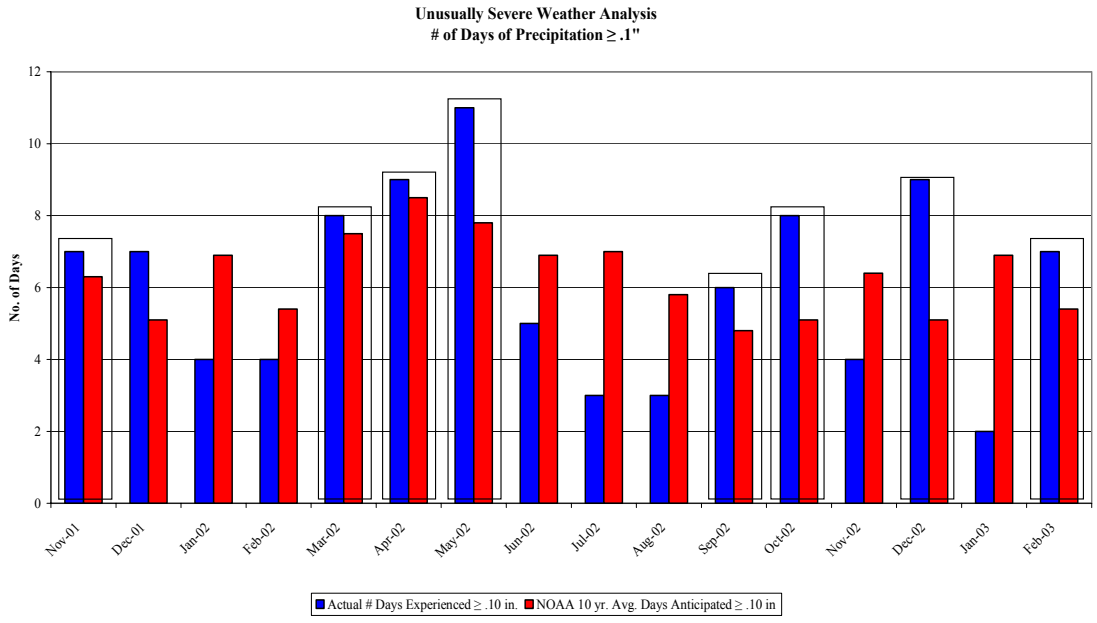
It is important to note that adverse weather is not just how hot or cold the temperatures are or how much rain or snow falls. Wind can have as much or more of an adverse affect on performance. For example, a sustained period of high winds could severely impact setting structural steel or window wall installation. The combination of wind and low temperatures, wind chill, can adversely affect workers productivity. For example, if the actual temperature is 20° F and the wind speed is 10 miles per hour, the effective temperature is 4° F. With an effective temperature of 4° F and relative humidity at 50%, labor productivity is reduced to 77% of ideal productivity. Any work exposed to the elements during the winter months has the potential to lose significant labor productivity, definitely an adverse weather condition.

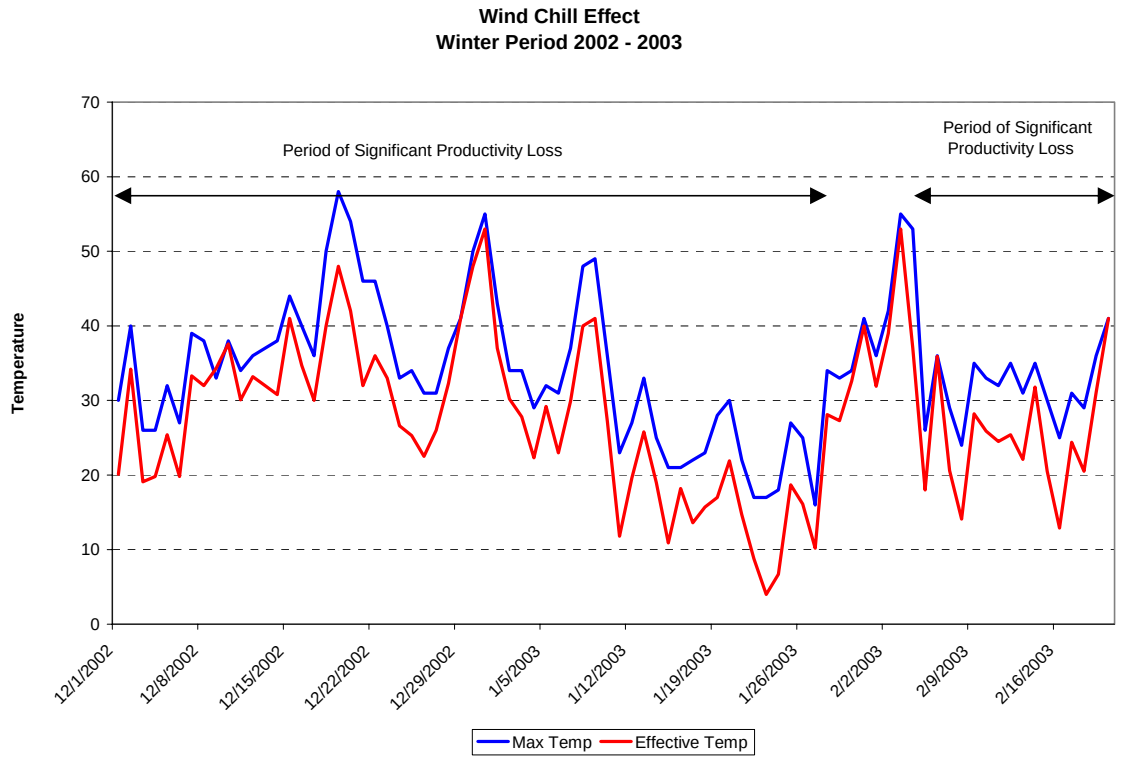
There have been various studies conducted by individuals and associations to provide useful data to quantify the effects of temperature on productivity. The study conducted by NECA (National Electrical Contractors' Association), as published in Adrian & Adrian, Total Productivity and Quality Management for Construction is the source for the example discussed above.

We all know that dealing with the weather is not always as straightforward as described above. Many times, other unanticipated delays will "push" a sequence of work into a time period where adverse weather is the norm, i.e. rainy springs or snowy winters. Say the preliminary "weather impacted" schedule indicated concrete work, which is on the critical path, was to occur in September and October, months usually still warm with moderate amounts of precipitation (depending on the geographic location). But, as the excavation process begins, there are some serious unexpected site conditions that could not have been determined during the preliminary research of the project. It takes two months to resolve these issues, which pushes the concrete work into November and December. In the northern area of the country, this could lead to significant adverse weather delays.

In addition to the forms of delay notification discussed above, it would also be helpful to prepare a formal submission for a time extension due to adverse weather delays once the project has reached a point where weather is no longer a concern. This submission should include a narrative describing the effect of the adverse weather on the project, including what historical weather data was relied on and from which local weather station. The narrative should also include as much specific information as possible. Specific dates adverse weather occurred, the critical path activities affected, which trades were affected, any other explanatory and descriptive information you can provide will only help to support the claim.

Graphics should also be used as an integral part of the narrative. They will visually display the affect and the specific periods of time where the weather had impacted the project. The first of the following examples shows a representation of the months of the project were affected by unusually high amounts of precipitation. The second example shows how the wind chill affected productivity in one winter period of a project. Both of these graphics, as well as others representing other adverse weather conditions help support the facts stated in the narrative.





Also included, as backup to the submission, would be copies of the specific NOAA data used, any productivity data relied on, copied of the jobsite reports stating the adverse weather affects, copies of previously submitted notices of delay for adverse weather, and any other project information to support your claim. This can only further demonstrate the entitlement to a time extension.

Conclusion

The bottom line, plan as best you can for normal adverse weather, know what your contract requires for adverse weather, keep records of adverse weather occurrences, carefully memorialize any adverse weather delays as a result of previous project delays and submit time extension requests as required by the contract.