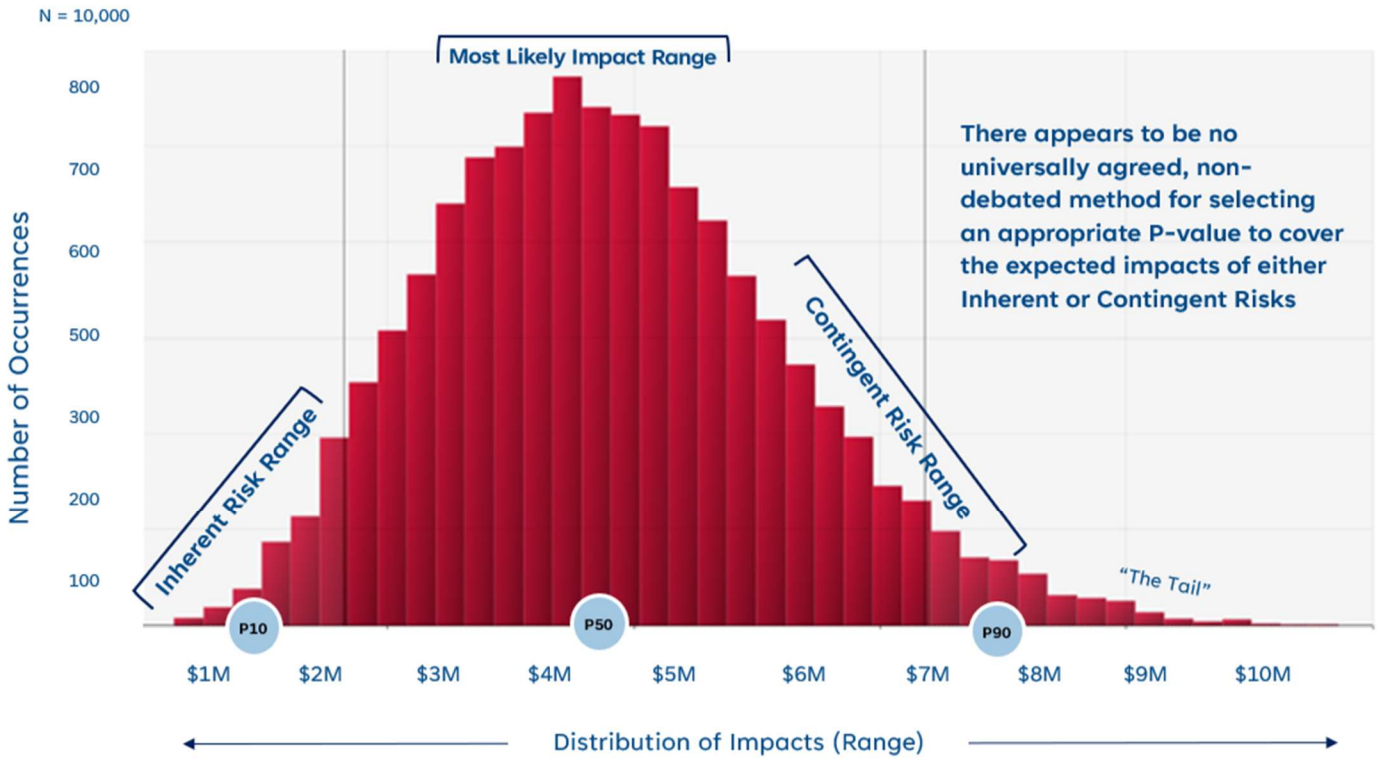


Understanding Inherent vs. Contingent Risks - a Major Project stakeholder's guide to more effective Risk Planning

Dr. Warren Black | Risk, Resilience & Complex Systems Thinking
May 18, 2025

One of the most misapplied aspects of risk planning within Major Projects (in my experience) is the delineation between "Inherent & Contingent" risks. For what ever reasons, this appears to be a poorly understood aspect of project risk management and presumably as a result, few organisations seem to get it right. When considering that such risks can represent millions of dollars in additional project cost or even months of project delays, the effective planning for such risks is a critical component of both Project Planning and Project Risk Management. There is in turn a need for invested project stakeholders to understand what is required when planning for Inherent versus Contingent Risk.

Risk is the impact of uncertain events & circumstances, on a project's stated objectives (cost, time, quality & benefits)

Within the context of major projects *and* probabilistic risk analysis, *Inherent* is the title given to those higher probability risks that are expected to occur under normal operating circumstances. Whereas *Contingent* Risks are those risks of varying probabilities which may or may not occur, depending on future possibilities and contextual circumstances. Simply put, *Inherent* risks are those which are almost certain to occur, whereas *Contingent* risks are those which might possibly occur, but then also might not.

Although the described difference may sound like semantics, this is an important distinction in project risk planning as risks which are mostly expected to occur, represent a different planning materiality than those which might possibly occur. Consider how if a risk has a high probability then they are closer to certainty than uncertainty, and so there is an implied duty of care to effectually plan for these risks as a normal operating circumstance. Whereas, varying probability risks which may or may not occur, are significantly more uncertain, and so their potential impacts are best covered by some form of additional reserve, which may or may not be required.

Source: https://www.linkedin.com/pulse/understanding-inherent-vs-contingent-risks-major-project-black-jrutc/

Thus the fundamental difference between *Inherent* and *Contingent Risks* within project planning, is that one is planned for in the Base Plans as a to-be-expected operational allowance, and the other is planned for as a possible (but not totally certain) additional contingency allowance. This delineation, in turn, allows for a more demonstrable and weighted approach to managing both "expected" and "potential" risk. It also ensures that the correct planning instruments are assigned to each *risk type*.

SPECIAL NOTE before reading on

It has been my experience that there appears to be no way of describing, nor practicing, any particular Project Risk Planning method that suits all circumstances, elicits universal confidence and eliminates all academic debate. In fact my experience has been quite the opposite.

With George Box's famous quote in mind, “all models are wrong, but some are useful”, the purpose of this paper is not to enforce a particular risk planning method but rather to offer a "useful" insight into what we are trying achieve when planning for risks within Major Projects. It is then for each reader to determine for themselves how best to apply what is discussed.

Understanding how Risk fits into Project Planning

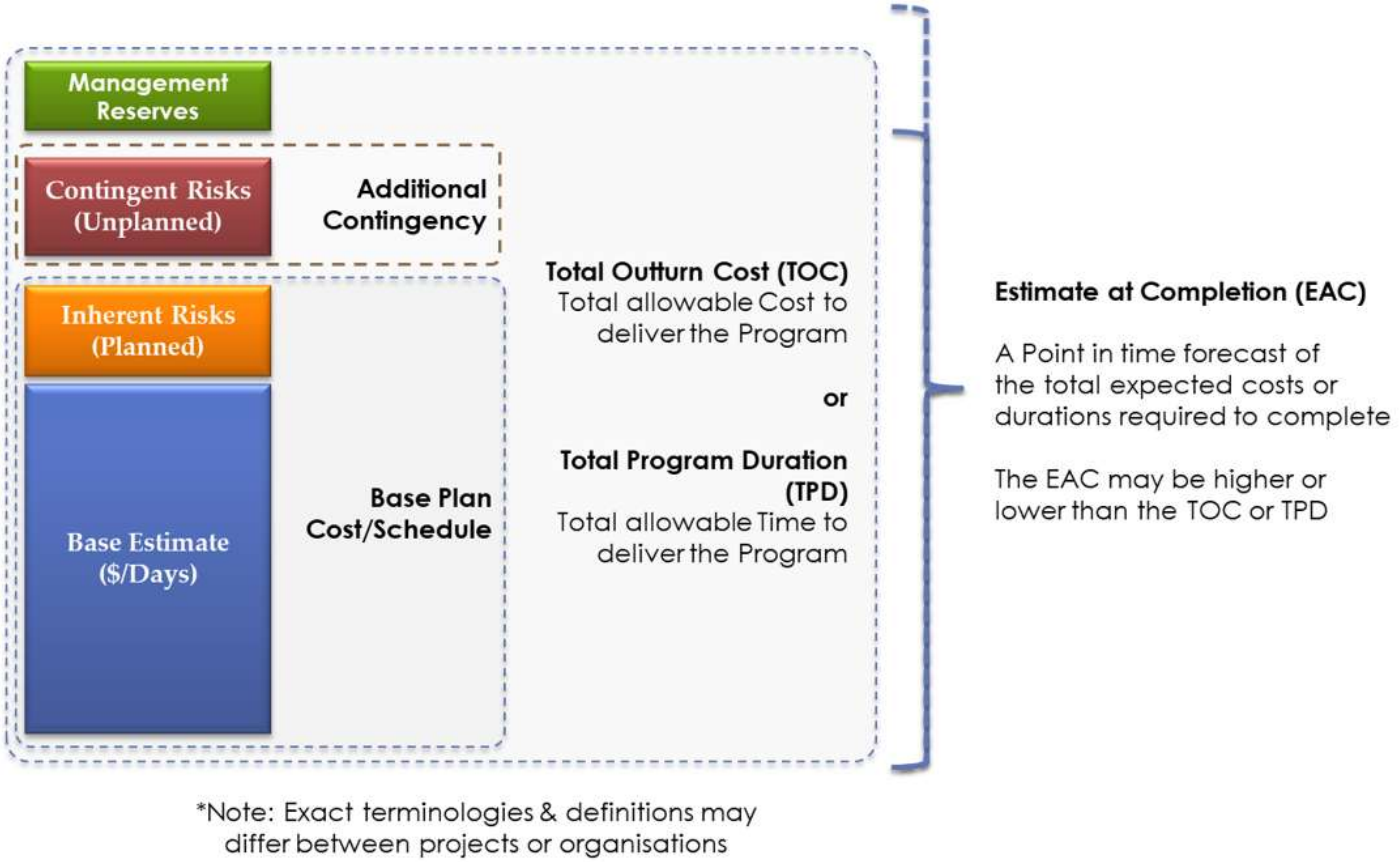
In order to understand why it is important to delineate Inherent and Contingent risks within Major Projects, we first need to understand how Risk fits into project planning and related performance management.

A Project's ultimate performance is determined by a simple formula

In its simplest form, a project's performance can be determined by the fundamental logic of Base Estimate + Impact of Risks = Total Project Outcomes. It is the impact of risks over and above what was planned/estimated that determines the final project result. This has been true for every Major Project plan since the beginning of human civilisation. Thus any credible attempt to plan & deliver a project, has to be approached in a manner that is *risk informed*. More to the point, understanding and mitigating the potential impacts of material risks, is critical to project success.

Building on this requirement, when developing a project plan, the appointed planners will start by developing a relatively deterministic view of the required costs and durations (see blue block in graphic below). This *Base Estimate* normally represents a fairly *risk free* view of the world. That is, what to expect if everything was delivered on time and to the quoted costs. Of course we do not live in a risk free world, and also considering that Major Project base estimates are often determined many years in advance of project execution, diligent planners will opt to make some allowances in their base plans for the potential impact of expected risks, and possibly even some unexpected risks.

Source: https://www.linkedin.com/pulse/understanding-inherent-vs-contingent-risks-major-project-black-jrutc/



Demonstration of the Project Risk Planning Logic

When planning for risk within a Major Project, the first step is normally to determine how much "buffer" for risk should be added to the *Base Estimate* for those risks which are expected to occur under normal operating circumstances. These risks are typically your known, higher probability risks and include the risk of errors in the base estimations, normal price increases, quantity fluctuations, impacts of seasonal weather, schedule slippages, delivery delays, performance issues, prolongation etc. By evaluating the potential impact of these known, high probability risks, planners now have a means upon which to determine an adequate "buffer" for Inherent Risks. Thus the combination of an agreed *Inherent Risk allowance* added to the *Base Estimate* then determines the "Base Plan" for both cost & time.

Once the Base Plans for cost & time have been determined, the second form of risk planning is to determine how much additional risk buffer is required for those risks which have either not been planned for or are simply too uncertain to quantify in a plan. Such risks are commonly referred to as **Contingent** Risks and represent those risks of varying probabilities which may or may not occur. Such risks may include the impacts of unplanned events, shocks, disasters and bad luck. Most commonly, Contingent Risks represent all those discreet risk scenarios which could impact the project over and above what has already been planned for. For example, if some allowances have been included in the Base Plans for normal, to-be-expected risks such as seasonal cost increases and weather delays, then the *Contingency* should represent the impact of excessive cost increases (price shocks) and abnormal weather (storms, floods).

Once the project planners have evaluated the most probable impacts of all the qualifying Contingent Risks, this quantum can then used as the basis to determine a suitable Project Contingency amount. This ***Contingency*** then represents an available sum of money (or time) that can be accessed if and when specific Contingent Risks materialise. It is an optional amount which may or may not be used depending on how future circumstances play out.

Source: https://www.linkedin.com/pulse/understanding-inherent-vs-contingent-risks-major-project-black-jrutc/

As demonstrated by the planning graph provided above, it is only once both the Inherent & Contingent Risk allowances have been determined, that a Project's Total Outturn Cost (ToC), Total Project Duration (TPD) or Estimate at Completion (EaC) can be evaluated. All three of these are seminal metrics for both project planning and performance management. Thus any lack of rigorous risk evaluation will in turn compromise the validity of these three metrics, and so herein the demonstrable criticality of Risk Management within a Major Project context.

Understanding Inherent Project Risk

The accepted industry definitions of *Inherent Risk* are unfortunately broad and varied and often do not fit completely within the needs of Quantitative Project Risk Analysis (QRA). This inefficiency can become noticeably problematic when developing a universal Risk Management Plan, or when attempting to quantify the impact of risks.

Consider how, Enterprise & Safety risk guidelines commonly describe Inherent Risks as those risks which exist before controls & treatments are applied. However in financial management, Inherent Risk refers to the errors & omissions contained within financial statements. In Probabilistic Risk analysis, an Inherent risk is referred to as a *High Probability* circumstance. Whereas in Project Cost & Schedule management, Inherent Risk refers to the potential for uncertainty (or errors) in the plan. Such planning risks are then also defined by the associated guidelines as having a 100% certainty of occurrence. Yet many of the accepted Project Management guides tell us that any risk with 100% certainty of occurrence is not a risk, it is actually an Issue and should be treated through an Issues Management process?

Such obvious diversity in the industry accepted definitions & methods can create challenges in practice, especially for those organisations seeking to stay true to all the accepted guidelines. The unfortunate reality however is that it is actually not possible to remain true to all, as there are some potential logic errors (conflicts?) when comparing these guides, side by side. Because of this, major project stakeholders will need to agree (at some level) a customised and fit-for-purpose (aka "useful") method to apply within their own Projects.

For the purposes of Project Planning and QRA's, it is often more useful to consider Inherent Risks as those which are naturally inherent to the particular operational situation. That is, they are normal, to-be-expected circumstances, which if left untreated or unplanned for, will almost certainly affect the project's ability to be delivered on time and to budget.

If project stakeholders are expecting any specific risk to occur, then they have a duty of care to ensure that risk is adequately planned for. This is the fundamental premise of an Inherent Risk

In this regard, Inherent project risks typically represent those which are almost certain to occur i.e. they have a greater than 80% probability. An *Inherent Risk* analysis should then at a minimum, consider the impacts to the cost & schedule of;

- Uncertainty in the estimates (i.e. potential for differences between plan & actuals)
- Normal seasonal weather (rain, heat, wind, snow etc.)
- Normal cost escalations (inflation, price increases etc.)
- Prolongation (expected delays to key completion dates)
- High probability risk events (almost certain to occur)

Source: https://www.linkedin.com/pulse/understanding-inherent-vs-contingent-risks-major-project-black-jrutc/

Understanding Contingent Project Risk

Contingent Risks are those risks of varying probabilities which may or may not happen i.e. they are not certain to occur. Typically, Contingent Risks include all those discreet scenarios, unplanned events and emergent possibilities which have not already been accounted for in the planned budget & schedule. Their potential impacts are thus by default over and above of what has already been covered in the project's base plans.

Traditionally, Contingent Risks are documented in the Project Risk Register between a probability range of 10 - 90%. During the early project planning stages (concept & feasibility) Contingent and Inherent Risks may often be indistinguishable from each other, due to the immaturity of the content in the forming base plans. However by *Final Business Case* award, the differences and planning instruments in which they are represented need to be clear. A Contingent Risk Analysis should thus include the evaluation of all those possible risk events/scenarios which have a material cost or schedule impact. This may include;

- Discreet risk events
- Unplanned cost increases & schedule slippages
- Poorly managed changes to scope
- Excessive or inclement weather
- Delays in critical approvals
- Delivery delays & losses
- Safety incidents
- Site issues e.g. contamination, ground water, utilities
- Non-compliance e.g. an environmental notice
- Contractor performance issues
- Labour issues e.g. union influences, strikes
- Resource availability e.g. hot markets, specialist skills
- Community impacts e.g. protests, complaints, cultural heritage
- Land purchases & site access issues
- Technology issues e.g. new or unproven systems
- Shocks & disasters e.g. a flood or fire
- Macro issues e.g. global supply constraints, market turbulence etc.

If risks are unforeseeable, unknown or uncertain, they can not be represented in the standard operating plans, rather they require additional contingencies to be available "just in case"

Source: https://www.linkedin.com/pulse/understanding-inherent-vs-contingent-risks-major-project-black-jrutc/

Risk Class	Inherent Impact to be planned for	Contingent Impact to be planned for
Seasonal weather impacts	Normal "to be expected" impacts based on established weather models and regional experience	Abnormal events such as excessive rain, flooding, disasters, bushfire, heat waves etc
Cost escalations	Normal escalations due to inflation, contracted increases, incentives	Abnormal escalations due to hyperinflation, price shocks, economic turbulence
Schedule Slippages	Normal slippage and performance issues which might impact on planned durations & completion dates	Abnormal or excessive delays due to macro global factors, supplier issues, excessive lead times, manufacturer issues etc.
Discreet Risk Scenarios / Events	Risks with a probability of occurrence of between 80-100% This range suggests an almost certain confidence that these risks will materialise	Risks with a probability of occurrence of between 5 - 90% Represents a risk allowance generous enough to cover most unplanned risk events, but not so generous that every risk is fully covered

Demonstration of how Inherent & Contingent Risks might be delineated within Planning

Quantifying Inherent & Contingent Risk Impacts

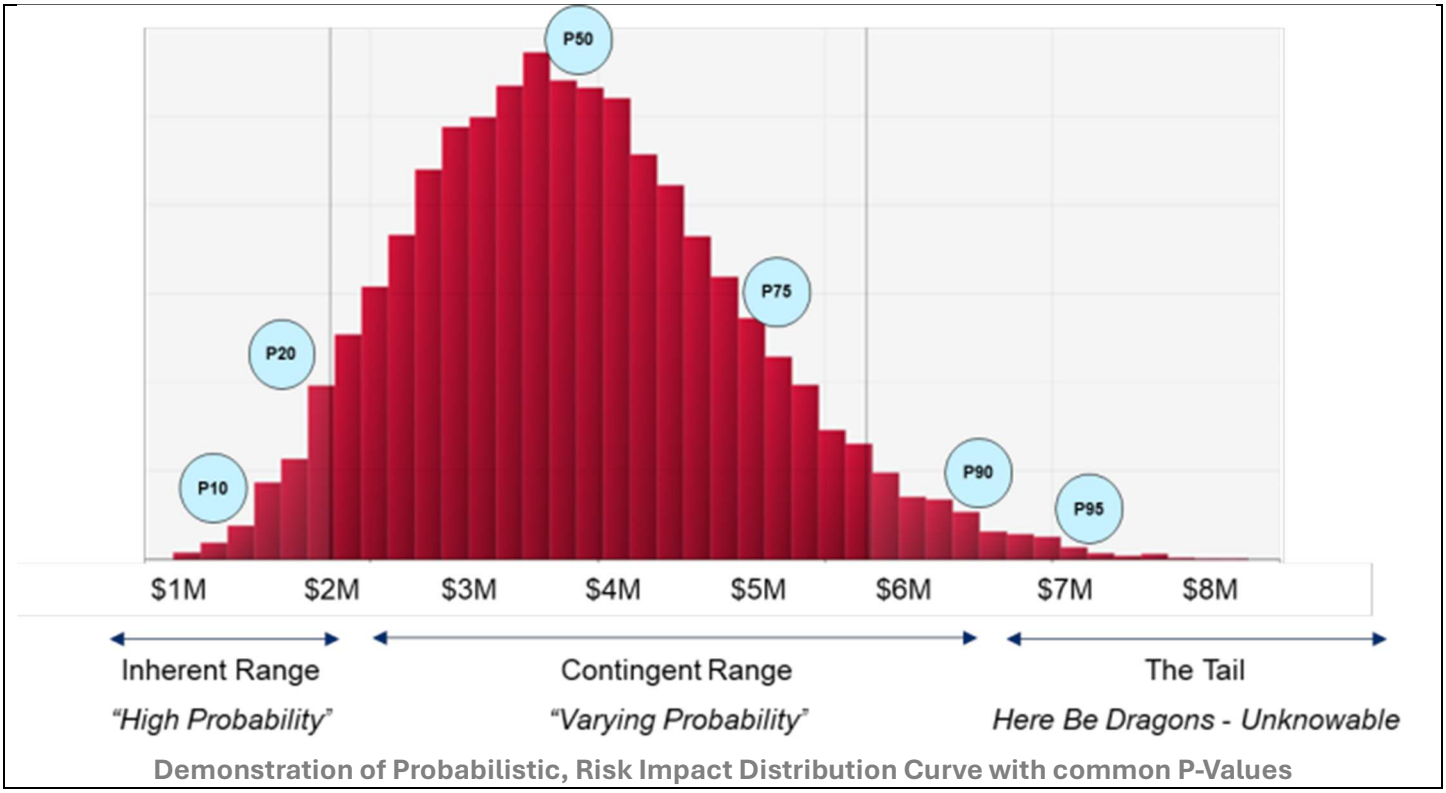
Quantifying the impact of risks for the purposes of assigning appropriate contingencies within project plans, is a notoriously contentious exercise. There are numerous books, guidelines, standards & certified courses which claim to help in this regard, but in the end the method is still highly subjective (sorry but it is true).

Argue it any way you wish, but allocating adequate contingency to cover potential risks which may or may not happen, requires a valid understanding of how future events will play out, it also requires a fair amount of assumption and fortune. For these reasons, planning for the "right" contingency is subjective and is almost always based on a particular stakeholder group's personal levels of comfort.

Again, there appears to be no universally accepted rules for selecting a specific inherent or contingent amount, but the most common and widely endorsed method within a Major Project context, is to develop a ***Risk Impact Distribution Curve*** through a Monte Carlo simulation. Note: The purpose of this paper is not to explore the details of The Probabilistic Risk Method nor that of Distribution Curves, but to discuss Inherent & Contingent Risks in light of Project Planning. Some further guidance on these topics is however offered in a number of supporting articles listed at the bottom of this discussion.

The benefit of a Monte Carlo based probabilistic risk simulation is that it demonstrates in graphic form the most probable impacts of a single risk or portfolio of risks on a particular project objective (normally cost or time). Of particular interest are the demonstrated "P-Values". These are indicators of various probabilistic points of confidence on a distribution curve, ranging from the P0 (the lowest value on a curve) to the P100 (the highest value).

Source: https://www.linkedin.com/pulse/understanding-inherent-vs-contingent-risks-major-project-black-jrutc/



Demonstration of Probabilistic, Risk Impact Distribution Curve with common P-Values

Each P-value represents the probability, certainty or confidence of a particular value on the distribution. For example, the P75 demonstrates the point whereby there is no more than a 25% probability this particular value *will be* exceeded, and thus there is a 75% probability the value *will not* be exceeded.

The P-Values are thus particularly useful indicators of both the Inherent and Continent impacts of a particular risk circumstance, as each relates to a particular probability range. More to the point, the P-Values can logically be used to determine the "right" amount of risk to plan for within either the base plans or the additional contingency pot.

Selecting the "right" Inherent Allowance

The basic planning logic which underpins an Inherent Risk, is that if project stakeholders are expecting the risk to occur under most normal circumstances, then the impact of the risk needs to be planned for (in some part) within the standard budget & schedule. This is the seminal, key point of Inherent Risk which is often missed by project stakeholders - risks which are "to-be-expected", need to be demonstrably planned for as a normal operating circumstance.

When first evaluating the full impact of a particular risk circumstance through a distribution curve, the P0-P20 range is generally considered the inherent impact range as this value range has the highest probability of being exceeded i.e. with more than 80% confidence. As these risk impact values are "almost certain" to materialise, it would be particularly prudent for project planners to consider including them in the base cost & schedule plans. These higher probability impact values are closer to certainty than uncertainty and thus should be considered a *normal* operating cost or time inclusion.

It should be noted that in almost all cases, the specific P-values selected as the Inherent Risk allowance within the base plans, will be based on the invested stakeholders' particular appetite for risk taking. Thus project stakeholders will need to determine, through extensive consultation and evaluation, how much of an inherent allowance (or which P-Value) is considered acceptable.

Source: https://www.linkedin.com/pulse/understanding-inherent-vs-contingent-risks-major-project-black-jrutc/

If they have a high tolerance for risk taking they may adopt a larger buffer e.g. the P20 value. Equally, if they have a low risk tolerance they may only add a small buffer e.g. the P5 value. Equally they may just add a deterministic value (e.g. 4%) to the base estimate, but deterministic additions are not normally recommended for larger, more complex and uncertain projects.

Regardless of which P-values are selected, once an appropriate Inherent Risk allowance has been included in the base plans, all values over and above this value are then considered to be Contingent Risk impacts. Thus by selecting the specific Inherent amount ($/days) the invested stakeholders have delineated the border between the two sovereign states of Inherent & Contingent Risk.

Selecting the "right" Contingency Amount

The basic planning logic which underpins Contingent Risk, is that if project stakeholders are uncertain as to whether a particular risk circumstance may or may not occur, then the potential impacts should not be included in the Base Plans. Rather, they should be accounted for in some form of optional, available Contingency pot to be accessed only when and if the specific qualifying risks materialise.

Just as when selecting an appropriate Inherent allowance, the specific contingency value that is selected tends to represent the invested stakeholder's appetite for risk taking. However, on a probabilistic distribution curve, the optimal Contingency range normally sits between the P60 and P90, depending on the project stakeholder's appetite for risk taking. This value range is comfortable enough to provide a demonstrable risk buffer for most unplanned risks, but not so luxurious that appointed risk officers can completely ignore their risk management obligations all together. As a general rule, Major Projects aim for the P75 (-ish) as their optimal contingency value.

Obviously any selected Contingency values will need to take into account what Inherent Risk allowances have already been included in the Base Plans and so generally the final contingency value selected represents an amount over and above any previously selected inherent values. More to the point, the selected contingency value is independent of the inherent risk allowances. and should not be "double accounted".

Once the contingency P-value has been selected, all impact values under this amount are deemed to be within the Project's accepted risk tolerances. However, any risk impacts that may materialise beyond this chosen value are then considered to be "uncovered risk". That is, if the agreed contingent value is exceeded, then additional funding (or time) will be need to be sought out, as there is no planned allowance (cover) for the excess. Seeking additional funding (or time) from project investors/owners, normally comes with all sorts or reputational and performance questions as it essentially means re-baselining the project. This action is thus best avoided.

Thus simply put, contingency serves as a *buffer* for absorbing/bearing the impacts of unplanned risks which may materialise above the selected Inherent P-value and below the selected Contingent P-value limit. However, in order for any selected contingency amount to be considered valid, invested stakeholders will need to determine the "right" amount based on their personal tolerances, contextual circumstances and access to resources.

Summary

Planning effectively for risk within Major Projects is a particularly contentious exercise and presumably as a result the discipline has a demonstrably poor track record. Consider how despite all the noticeable industry advances in guiding standards, certified courses, technology and methods, more than 65% of Major Projects still fail to come in on time and within budget.

Source: https://www.linkedin.com/pulse/understanding-inherent-vs-contingent-risks-major-project-black-jrutc/

Although the exact causes of this persistent, negative phenomena are broad and varied, one of my particular concerns is that the manner in which the impact of risks is evaluated and planned for seems to be noticeably impaired. There are numerous vulnerabilities within the manner in which the industry guides express their methods and how appointed officers then practice them.

As discussed, the broad and varied industry definitions of "Risk" certainly do not help. Nor do the personal fixations of specialist risk experts who religiously endorse their one preferred method, whilst simultaneously ignoring their method's obvious vulnerabilities. For example, there appears to be a significant amount of guiding literature within the cost engineering universe, that only explains Inherent Project Risk in terms of the "Uncertainties within Planning". That is, Inherent Project Risks are defined as being solely the potential for variations and errors to emerge between what was planned (estimations) and what is eventually realised (actuals). All other forms of Inherent Risk then appear to be underplayed by these particular guiding methodologies?

Whilst *Uncertainties in Planning* are undoubtedly a valid Inherent Risk, they are not the only Inherent Project Risk. Thus when industry guides either under represent or flat out ignore the importance of planning for the impact of ALL *High Probability Risks* (not just Uncertainty in the Plans), they are potentially misrepresenting what an inherent project risk actually is. As a result, project planners who subscribe to these particular guides (alone), tend to either under represent *expected* risks within their base plans, or include far too many *expected* risks within their allocated contingency. Assigning the wrong risk impact values to the wrong risk planning instruments, simply creates vulnerabilities in both.

But its not just the cost engineering guides that have a contextually restricted view of risk, it is most industry guides, ala enterprise risk, safety risk, financial risk and so on. Each seem suited to a particular context and as a result do not neatly fit when applied to broader project planning or performance management. Considering this observed deficiency, it is within the interests of all invested project stakeholders to understand the basic goals and principals of Risk Planning and then determine for themselves which combination of methods are most useful to their particular needs. That's not to say that appointed project officers should go completely rogue to the industry guidelines, but rather don't become fixated on a single, standardised method. It is without doubt better to explore all the industry recognised methods and adopt the best of each, than to settle on a specific one.

However, when in doubt, refer to these three simple & logical Project Risk Planning Principles.

Principle #1: Any attempt at determining a project's final outcomes, needs to consider the impact of risk because **Final Project Outcomes = the Base Estimate + the Impact of Risks.**

Principle #2: Inherent Risks are those higher probability, to-be-expected type risks that need to be included (in some part) within the standard operating Base Plans, as a normal operational allowance.

Principle #3: Contingent Risks are those discreet possibilities of varying probability, which have not already been accounted for in the Base Plans. Such uncertain risks should be covered by an adequate, additional contingency amount which may or may not be needed.

There you have it folks, I hope this helps… if you want to learn more about quantitative, project risk methods, check out these additional papers

https://www.linkedin.com/pulse/invested-project-stakeholders-guide-understanding-risk-black-kzupc/
https://www.linkedin.com/pulse/how-interpret-risk-distribution-curve-particular-points-black-ostyc/

This original piece was authored by Dr. Warren Black (2025) as part of the development of a training & education series into how Quantitative Risk Analysis should be budgeted, for, resourced and engaged within Major to Mega Projects.

Source: https://www.linkedin.com/pulse/understanding-inherent-vs-contingent-risks-major-project-black-jrutc/