

Submission to the Electoral Review Committee

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STV: Meeks (NZ) – A Flawed Method For Use In Democratic Elections

Introduction

It says something from the outset, when STV was so enthusiastically endorsed and accepted by the majority of Otago Councillors, Community and Health Boards that were willing to “give STV a go”; in the hopes of “making every vote count” (as the advertising promised us), that not a single one of those elected representatives (and even the Electoral Officer himself) had anything more than a scant understanding of the actual methodology and mathematics behind the Meeks method of STV.

We’d been bombarded in the papers, on the radio, and on the television with messages extolling the purported advantages of STV over FPP – based largely around the principle that far less votes were apparently wasted under the STV system and, by and large, people were willing to accept this advice without delving into the underlying mechanisms of the candidate selection / rejection process. Those that did attempt to gain a deeper understanding were immediately struck by the seemingly impenetrable nature of the mathematics of the system and were content to back away slowly and leave well enough alone.

However, when the Meeks method (especially this uniquely NZ modified version of it) is actually examined up close, and the needlessly complicated fractional maths deciphered, it is clear that democracy in the 2004 local body elections was seriously let down and compromised by a system that, although comprehensive in its treatment of numbers, in fact does very little to further the cause of the democratic process in a fair and balanced manner that actually reflects the will of the People.

Furthermore, the unequalled incompetence of those contractors that were supposed to protect and render the democratic results back to us in a timely manner – for which they had been contractually obligated to ensure – thoroughly diminished the faith and support the People had placed in this new system [the STV electoral process]. Nineteen days to deliver a final result from a comparatively paltry number of voters reflects just as shamefully on the central and local government administrations who stood by – red faced and useless on the sidelines – as it did on the people responsible for the debacle in the first place.

Of course, after such a disastrous episode that made the 2004 local body elections in New Zealand the laughing stock of government administrations and café bars around the world, those affected by or interested in that particular episode surely now have at least a 90% better understanding of the rudiments of the Meeks method (NZ) of STV than they did before the election. It has been a hard and bitter lesson – the most difficult aspect of which was the realisation that, even in a multi-candidate ward or health board, the voter only had **one vote** that really counted and this was their *first preference* vote.

In hindsight; for no-one actually grasped the implications of it at the time, this primary weighting around the first preference vote and subsequent de-emphasis on the second and third preference votes (say, for a 3 Candidate Ward) actually denied the majority of voters two thirds of their democratic rights for their choice of representation in that particular Ward. This can be shown quite clearly in the actual results of the Dunedin local body electoral process, yet this fact [that your second, third, fourth etc votes may not count at all] was not even alluded to in any of the STV media propaganda that abounded at the time. The message was clearly to “make every vote count”, and that STV was supposedly a “fairer” polling method than FPP.

For the purposes of clarity, we will (in this submission) focus primarily around exposing the flawed nature of the Meeks method (NZ) STV process and show how using the methodology they did, that some local governments had their elected representation unduly and unfairly influenced by the minority of voters rather than the majority. We will even use the actual results from the time of Dunedin’s election; since it is only by using the facts of what happened can you truly see the implications and the magnitude of the travesty that was foisted upon the People.

The Dunedin Local Body Elections.

The debacle that was the Dunedin local body and Health Board election firmly soured the fledgling relationship that the candidates and the people had for STV and, although this has allowed us to focus on what went wrong and see the grave nature of the inherent procedural flaws, it has also allowed us to prepare and recommend a better model for the next election. There is no way that any part of the electoral rot that was perpetrated, knowingly or not, upon the People should be allowed to happen again.

If we look at the easiest real-world examples from the 2004 Dunedin Local Body elections for the Committee to “get their heads around” and show just how fundamentally flawed the Meeks (NZ) method is in both single candidate and multi-candidate wards:

1. The Meeks (NZ) STV method, when applied in a **single candidate ward**, contains a fundamental flaw when used in democratic elections...
 - (a) During the first iteration (ie. the assessment of the results of the first preference vote), the candidate that has the most first preference votes above the “quota” – based on the formula $[\text{number of number of valid votes divided by number of vacancies} + 1] + 1$ is declared elected. Other than the quota concept, this is essentially FPP in nature.
 - (b) However, if no candidates reach the quota after the first iteration, then this is where the undemocratic nature of this STV method reveals itself; for during the second iteration it is the second preference votes of the least successful candidate that are assessed and then transferred to the remaining candidates. If one of the leading candidates receives enough of the least successful candidate’s second preference votes to reach or exceed the quota – they are declared elected. Therefore, it is the second preference votes of this least successful candidate that determines (in this case) the elected representation of this example ward, and *none* of the other candidates’ second preference votes have therefore played any part in this election process.
2. When the Meeks (NZ) method is carried out in a **multi-candidate ward**, then this travesty of representation is increased so greatly; as to deny voters their fundamental democratic rights (albeit unbeknownst to the voters) – for in spite of the voters’ being entitled to vote for the number of candidates for which there are vacancies (ie. for three candidates in 3 Councillor ward etc) they are forced to ascribe a weighting system upon their choices by placing them in order of preference, and, as we now know, only the first preference votes carry any surety in STV (Meeks NZ) and the subsequent preference votes are mere bit players in the calculations that follow the first iteration; as candidates are successively removed from consideration after each iteration.
 - (a) During the first iteration, the candidates that have the most first preference votes to reach the quota – (based on the same formula as above) are declared elected. This again is essentially FPP in nature. And, as above, the second and third preference votes play no part in the election of candidates that reach the quota on the strength of their first preference votes. Thus it is that in, say, a three candidate ward, around two thirds of the valid votes cast for candidates in this ward example are ignored during the first iteration. So two thirds of valid votes are essentially dismissed out of hand in the first iteration; due to this emphasis of all subsequent calculations simply adding onto the results of the first preference vote. This is grossly unfair to the voters; since it should be that during the first iteration *all preference votes equal to the number of ward vacancies should carry equal weight* (ie. in a three candidate ward the 1st, 2nd, & 3rd preference votes should be combined for the first iteration), and the subsequent iterations would then be more meaningful. This combining of preference votes equal to the number of vacancies is the basis of the “Belcher/Oaten Method” version of STV – which we will discuss later.
 - (b) Further to this, and as in the single candidate ward example, if no candidates reach the quota after the first iteration it again falls to the second preference votes of the candidate with the least number of first preference votes to determine the likelihood of who shall

attain the quota and thus be the elected representative of that ward. The point here is that, during the second iteration, the vast majority of the second preference votes of the electorate play no part whatsoever in the second iteration! One can easily see the possibility of the second preference votes of a fringe candidate (with perhaps extremist minority views) thus being able to sour the flavour of an election outcome.

If the number of candidates that have reached the quota does not equal the number of vacancies, after the second iteration then the second preference votes of the next least successful candidate are distributed according to the voter's choice, and so on until the vacancies are filled (that's the STV methodology in a nutshell).

The fact remains that the majority of those people, as it turned out, that ended up voting for the most popular candidates (ie. the ones that got closest to the quota or that reached the quota after the first iteration) had their second, and third preference votes bound up and not used in the subsequent iterations. And that is a terrible wrong; for as well as being a misrepresentation of "make every vote count", it also means that the majority of people in that ward therefore only had a single vote – irrespective of the fact that they had a democratic right to choose, and have notice taken thereof, their choice of candidates equal to the number of vacancies (ie. if there were three candidates to be chosen, then each voter could reasonably expect that their first three choices would be considered – as under FPP you'd put three ticks – each tick being the same weight). Truth be known, if you actually want each of your votes to actually be counted, then FPP beats STV hands down; since it is, in effect, a single iteration process.

The Cargill Ward – Dunedin Local Body Election

We can use the Cargill Ward (3 vacancies) to show exactly how the will of a minority unduly influenced the outcome of the election in that Ward:

Candidate Name	1st It (1 st pref votes only)	2nd It (transfer 2 nd prefs)	3rd It	4th It	5th It	6th It	7th It	8th It	9th It	10th It	Disregarded Votes (2 nd , 3 rd prefs)
Teresa STEVENSON	1,266	1,313	1,317	1,327	1,360	1,275	1,368	1,411	1,223	1,195	2,390
Paul Richard HUDSON	948	953	965	998	1,068	1,082	1,142	1,283	1,247	1,189	2,378
Michael GUEST	726	735	750	777	840	853	929	1,103	1,168	1,193	2,386
Douglas Wayne HALL	660	675	712	749	814	828	907	1,028	1,089	1,112	2,224
Nicola HOLMAN	447	449	466	487	534	549	783	0	0	0	783
Jo GALER	385	391	409	429	484	450	0	0	0	0	934
Steve YOUNG	324	332	348	373	0	0	0	0	0	0	373
Alan MCDONALD	197	201	210	0	0	0	0	0	0	0	210
Calvin OATEN	142	143	0	0	0	0	0	0	0	0	143
Paul John MCMULLAN	115	0	0	0	0	0	0	0	0	0	115
<i>Quota / Threshold</i>	1,303	1,298	1,294	1,285	1,275	1,259	1,282	1,206	1,182	1,172	
TOTALS (valid vote papers)	5,210	5,192	5,177	5,140	5,100	5,037	5,129	4,825	4,727	4,689	11,936
<i>Difference (B-C) ie. NTV</i>		18	15	37	40	63	-92	304	98	38	
<i>Differences (C-B) (ie. lowest polling Candidate's 2nd pref vote)</i>	Teresa S	47	4	10	33	-85	93	43	-188	-28	
	Paul H	5	12	33	70	14	60	141	-36	-58	
	Michael G	9	15	27	63	13	76	174	65	25	
	Douglas H	15	37	37	65	14	79	121	61	23	
	Nicola H	2	17	21	47	15	234	783	0	0	
	Jo G	6	18	20	55	484	450	0	0	0	
	Steve Y	8	16	25	373	0	0	0	0	0	
	Alan M	4	9	210	0	0	0	0	0	0	
	Calvin O	1	143	0	0	0	0	0	0	0	
	Paul M	115	0	0	0	0	0	0	0	0	
Total of transferred votes		97	128	173	333	-29	542	479	-98	-38	
	<i>Checksum</i>	115	143	210	373	518	900	1,566	0	0	

Looking at the figures in Column 2, labeled “1st It” (first iteration), we see the following facts:

- Teresa Stephenson received 1,266 1st preference votes after the 1st iteration but didn't quite make the quota of 1,303 necessary to be elected. So we go to the 2nd iteration.
- Thus, the 155 voting papers of the candidate with the least number of 1st preference votes, Paul McMullan, are assessed and the 2nd preference votes on his 155 voting papers are redistributed to the remaining candidates (Paul McMullen's name is now withdrawn from any further consideration).
- Now we see in the column labeled “2nd It” (second iteration) that of the 115 voting papers assessed 18 votes were non-transferable (ie. 18 voters hadn't bothered to list any 2nd or 3rd preferences), 47 voters that put Paul as their 1st choice then put Teresa as their second choice – thus giving Teresa a total of 1,313 votes pushing her above the quota; and thus she is declared elected.
- The thing to notice is that the political, social, lifestyle, or cultural associations or sympathies are often clearly revealed in the assessment of a candidate's first few preference votes. The majority of the those that voted for Paul McMullan (an advocate for marijuana reform, in this case) gave their second preference vote to Teresa (a youth advocate with fairly relaxed views on certain social issues), and to Doug Hall (a casual dressing outspoken critic of certain DCC practices and issues).

For this reason alone it is important that the direction and determination of elected representation is taken from across an assessment and pro rata percentage based distribution of the total subsequent order preference votes, rather than just a straight vote transfer of a select minority.

- Technically speaking, it is worth noting that having the least number of 1st pref votes in a multi-vacancy ward doesn't necessarily mean they were the least successful candidate overall; as they may have been the second or third preference of many voters, but the Meeks (NZ) method disregards the majority of these secondary and tertiary preference votes in the first iteration and, as being the candidate with the least 1st prefs they are removed from the candidate list during the second iteration, and thus the candidate is denied the opportunity to find out how they actually fared in the minds of the People. These are flaws of such magnitude; as could only be devised by an ethereal academic – for FPP would at least reveal this information to all candidates from the outset.

It is entirely possible that Paul McMullan, although he received only 115 1st preference votes, may have been the 2nd and 3rd preference of over 1,000 Cargill Ward voters that had voted for Teresa Stevenson and the other high scoring first preference candidates (making over 2,000 voters that wanted him as a Cargill Ward Councillor and thus he would surely be elected) – but the Meeks method categorically denies this democratic right – for it is mathematically possible for a candidate to receive the majority of 2nd and 3rd preference votes in a three vacancy ward but to be eliminated from further consideration after the 1st iteration, whereas they would be elected under an FPP system. Furthermore, we have no way of knowing what each candidate received in the way of anything other than their 1st preference votes; since this data has still not been released by the private contractors (despite repeated requests for the full dataset).

- Further iterations are carried out, as seen in the table on the previous page, with the 2nd preference votes of each lowest polling (1st prefs) candidate being subsequently heaped upon the remaining candidates (as well as some seemingly arcane and inexplicable fractional Meeks' maths) until the vacancies are filled.

The Belcher/Oaten Method – Proportional STV that reveals the true will of the People

It is utterly unconscionable that a method of electoral assessment is adopted, as the Meeks (NZ) method has, that is not auditable without access to a complex set of STV calculations, or wherein the data upon which these calculations are based is hidden from view from the ordinary citizen, and that the maths itself is so opaque to scrutiny that only those with special access to the original dataset and computers can make any sense of it. That this type of inscrutable system is exactly what has been adopted (albeit in good faith) has since revealed itself to be more than a handful even for its apparent Masters who, when the proverbial hit the fan, issued a sequence of ever more fanciful excuses for their failure to deliver.

Any methodology that affects the future of the citizenry *must* be transparent and auditable by a reasonable mind, and clearly show all the data upon which any calculations are based.

At the conclusion of the 2004 local body election, Mr. Doug Hall identified discrepancies in the dataset sent out by Electionz.com (via the D.C.C.) and brought the nature of these discrepancies to the attention of the authorities, the media, myself and Mr. Calvin Oaten. We owe Doug a debt of gratitude for his perseverance in winking out the nature of the discrepancies and encouraging often reluctant observers, such as myself, to gain the same insight as he. It was Calvin Oaten who then meticulously identified the mathematical and procedural flaws of Meeks (NZ) and devised the “antidote” and comparatively straight forward math procedures to deliver the correct results from any future STV election.

The Belcher/Oaten Method – Principles and Mathematics

The determination of the quota is determined according to the formula:

$$\text{Quota} = \left(\frac{\text{Number of Valid Votes}}{\text{Number of Vacancies}} \right) \times \left(\frac{\text{Number of Vacancies} + 1}{\text{Number of Candidates}} \right)$$

This quota is calculated at the outset and is not recalculated after each iteration, since no candidate is removed at any stage.

1. In a single vacancy ward, where a candidate(s) has reached the quota – the candidate with the highest number of first preference votes is declared elected. However, where no candidate has reached the quota, the 2nd preference votes ascribed to *all* the candidates must be applied on a pro rata percentage basis (of the sum total of all valid 2nd preference votes) for each of the candidates. If no candidate yet reaches the quota, then the 3rd preference votes ascribed to all candidates must be applied on a pro rata basis, and so on until a candidate reaches the quota. If no candidate reaches the quota after the final iteration (equal to the number of candidates), then the candidate closest to the quota is declared elected.
2. In a multi-vacancy ward the 1st iteration should comprise the combined preference choices equal to the number of vacancies (ie. in a 3 candidate ward the 1st, 2nd, & 3rd preferences carry equal weight and are combined per candidate) and so the 1st iteration carried out. If no candidate yet reaches the quota, then the 4th preference votes ascribed to all candidates must be applied on a proportional pro rata basis across all the candidates (this is the 2nd iteration), and so on until a candidate reaches the quota and all vacancies are filled. No candidates are removed after any iteration; as their fortunes may change during a subsequent iteration. If no candidate reaches the quota after the final iteration then the candidates closest to the quota are declared elected.

And that’s the Belcher/Oaten Method in a nutshell – simple, effective, transparent, readily auditable, and most importantly fair and democratic. It utilizes none of the arcane and ultra-complex mathematical rendering requiring total reliance on computers to calculate the result, nor does it obscure the dataset from scrutiny as the output from Electionz.com has done.

We intended to apply the Belcher/Oaten Method to the real-world dataset from the Dunedin local body election but, despite forwarding repeated requests in writing since October last year for the dataset showing (in tabular format) the number of preference votes each candidate received (ie. for Candidate X – how many 1st prefs, 2nd prefs, 3rd prefs etc they each received), both the Dunedin City Council and Electionz.com have been either unwilling or unable to supply this requested information in time for this submission to the Electoral Review Committee.

So we'll use the known 1st preference votes from the Cargill Ward and we'll just have to put in some fictional figures for the subsequent preference votes; in order to show how the Belcher/Oaten Method works.

Candidate	1's	2's	3's	4's	5's	6's	7's	8's	9's	10's
Teresa STEVENSON	1266	538	246	327	355	145	35	17	12	4
Paul Richard HUDSON	948	544	437	255	422	254	54	26	6	0
Michael GUEST	726	437	213	411	367	413	211	109	76	16
Douglas Wayne HALL	660	1102	1209	633	478	314	244	112	45	34
Nicola HOLMAN	447	407	367	344	212	322	12	37	23	2
Jo GALER	385	231	264	290	454	354	211	112	32	3
Steve YOUNG	324	124	387	567	367	312	314	289	23	7
Alan MCDONALD	197	241	453	443	523	411	217	115	65	12
Calvin OATEN	142	567	675	677	354	433	312	98	54	31
Paul John MCMULLAN	115	987	876	980	678	432	212	34	45	16
TOTAL VALID VOTES	5210	5178	5127	4927	4210	3390	1822	949	381	125
<i>Non-Transferable Votes</i>		32	51	200	717	820	1568	873	568	256
Candidate	Cumulative Total until Quota reached	1st It (1+2+3)	2nd It (4 th pref)	3rd It (5 th pref)	4th It (6 th pref)	5th It (7 th pref)	6th It (8 th pref)	7th It (9 th pref)	Final It (10 th pref)	
Teresa STEVENSON	2072 <i>elected</i>	2050	22	30	6	1	0	0	0	
Paul Richard HUDSON	1942	1929	13	42	19	2	1	0	0	
Michael GUEST	1410	1376	34	32	50	24	13	15	2	
Douglas Wayne HALL	2971 <i>elected</i>	2971	81	54	29	33	13	5	9	
Nicola HOLMAN	1245	1221	24	11	31	0	1	1	0	
Jo GALER	897	880	17	49	37	24	13	3	0	
Steve YOUNG	900	835	65	32	29	54	88	1	0	
Alan MCDONALD	931	891	40	65	50	26	14	11	1	
Calvin OATEN	1477	1384	93	30	55	53	10	8	8	
Paul John MCMULLAN	2173 <i>elected</i>	1978	195	109	55	25	1	5	2	
TOTAL VOTES PER IT		15515	4927	4210	3390	1822	949	381	125	
Quota	2069									

For the 1st iteration, the preference votes equal to the number of vacancies are combined (ie. in a 3 vacancy ward, all the 1st prefs, 2nd prefs, and 3rd preference votes are combined, and in a 4 vacancy ward the 1st, 2nd, 3rd, & 4th preference votes are combined for the 1st iteration), and each candidate's total is compared with the quota. Those candidates that reach the quota are elected, those vacancies that remain are filled as each subsequent iteration is carried out. If no more candidates reach the quota after the final iteration, then the closest one(s) to the quota are declared elected.

Looking at the example table above we can see that Doug Hall was elected upon the 1st iteration, and Paul McMullan and Teresa Stevenson elected after the 2nd iteration. You can see that although Paul McMullan may not have been many people's first choice, many (in this fictional example) decided to give him their 2nd, 3rd, or 4th preference vote – and so he was genuinely one of the People's overall choices.

To get the figures for the 2nd iteration (ie. assessment of 4th preference votes) column onwards we simply divide the number of 4th pref., votes each candidate received by the total number of 4th preference votes, and then multiply by the actual number of 4th pref., votes per candidate; as shown in the formula:

$$\left(\frac{\text{No. of X}^{\text{th}} \text{ pref votes for Candidate}}{\text{Total No. of X}^{\text{th}} \text{ pref votes}} \right) \times \text{No. of X}^{\text{th}} \text{ pref votes for Candidate}$$

We round up or down to the nearest whole number. This gives us a pro rata set of figures that retain the proportional popularity of each candidate, as decided by the People, to add to the cumulative total of the previous iterations. Ultimately, the vacancies are progressively filled as candidates accumulate proportionally transferred votes and reach, or get closest to the quota upon completion of the final iteration.

It's clear, it's fair, it's transparent, it's accurate, and it's democratic.

Summary

There is little doubt that the intention of STV proponents was genuinely desirous in improving and advancing the democratic process in this country, and this is a laudable aim. That they were thoroughly let down and embarrassed by those entrusted with the task is deeply unfortunate. Furthermore, it is a salutary lesson against the privatisation of processes or procedures into the hands of the inept, and one would've been thought safe in thinking that these lessons would've been well learned by now; from watching such disasters as they happened around the world – especially in Thatcher's Britain.

In any case, we believe that whoever is responsible for the conducting of an electoral process, that it be conducted using methodology that is open to immediate scrutiny, that it be accurate, fair and democratic etc. The Electoral Review Committee has asked for submissions; with the object of seeking ideas and advice from the public and we believe that we have put forward a proposal that meets the requirements of the People rights to have their voices and votes heard without interference or corruption.

May it please the Committee, we thank you for the opportunity to present this submission to you and thank you for your time.